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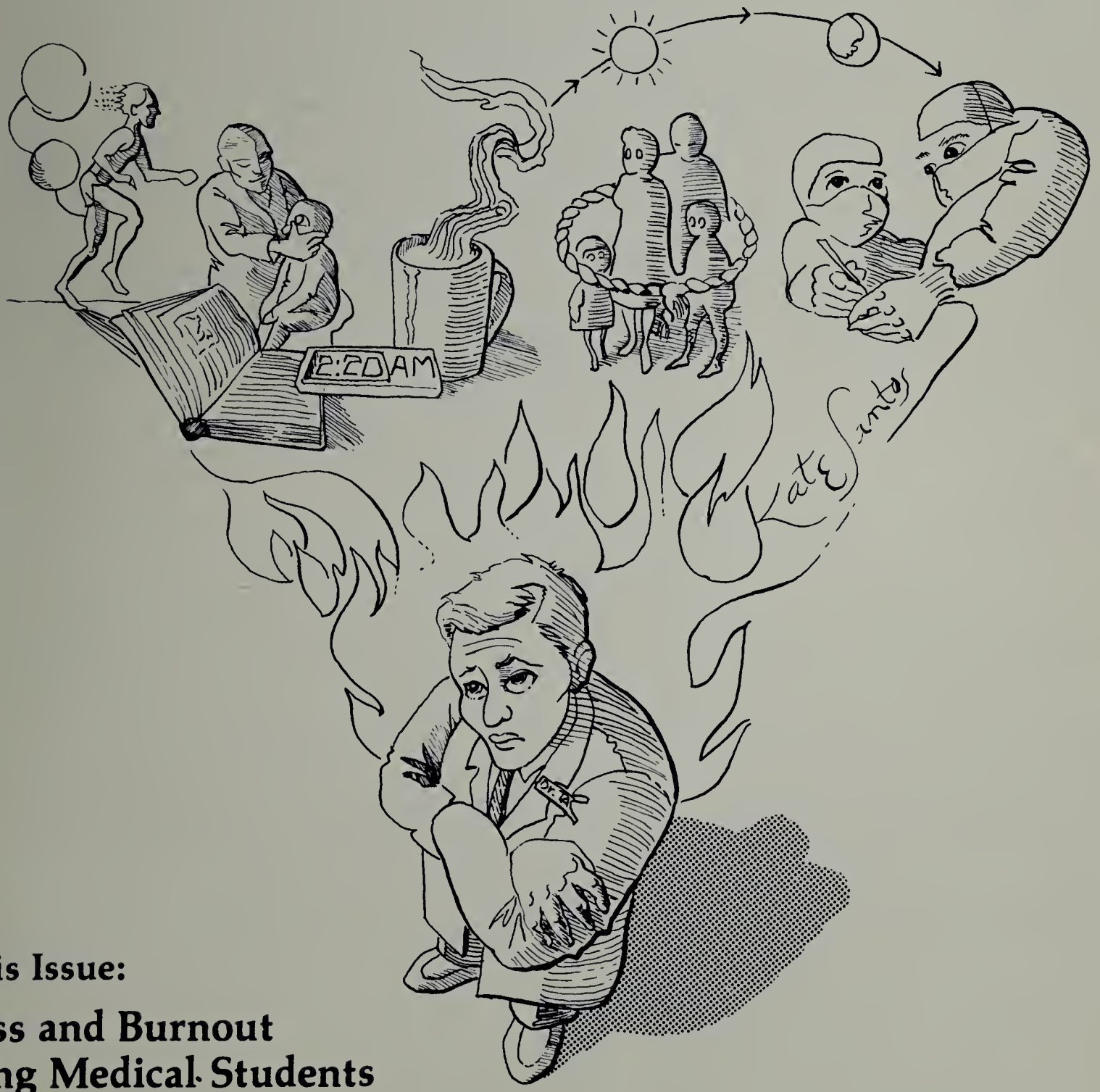

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Stress and Burnout among Medical Students and Physicians

by Dr. Mary Vachon

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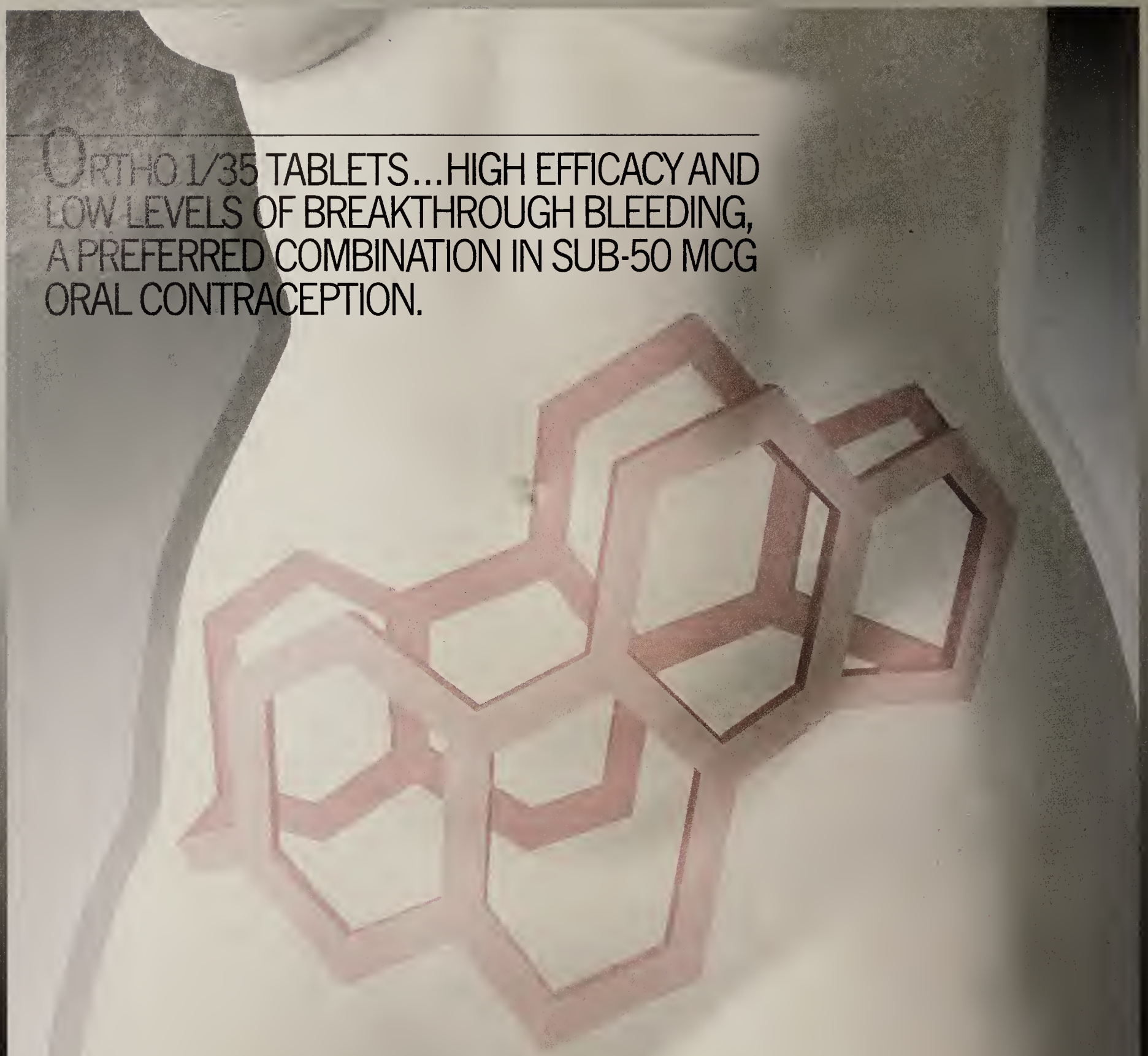

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3) Illustrations, graphs, diagrams and figures should be put on a separate sheet and identified by Arabic numerals. A list of explanatory legends for all the figures and diagrams should be put on another sheet. Do not write on the back of photographs.
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GUEST ARTICLE

Stress and Burnout Among Medical Students and Physicians

M.L.S. Vachon, R.N., Ph.D.

Physician stress has become a popular topic in the past few years as research has shown that physicians have a higher than expected incidence of alcohol and drug abuse, psychiatric illness, suicide and marital difficulties. Such manifestations of stress are thought to evolve as a response to stressors coming from the personality characteristics and familial background of the individual, the physician role, and the environment in which one practices. This article will attempt to highlight a few of the potential stressors for medical students and physicians to look at the manifestations of stress that might be commonly observed in such situations, and to discuss a few coping mechanisms that medical students and physicians have actually found helpful in dealing with the stress they experience. The data to be discussed are drawn from the literature, clinical experience and interviews with physicians throughout North America. These were carried out as part of a study of occupational stress among medical personnel.

Sources of stress

1. Personality Variables

Much of the literature on the personality structure of those who are accepted into medicine shows that medical schools attract perfectionistic, obsessive, highly competitive people who have a great ability to delay gratification and little tolerance for personal or professional frustration. Often the potential medical student has had to focus most of his or her energies on the academic achievement necessary to obtain a place in medical school and so may have a paucity of close relationships. Such a person may have decided to enter medical school because of the intellectual challenge it presents, a desire to stamp out illness and save lives, an inordinate fear of death and desire to gain control over it, family pressure, a desire for professional status and substantial financial remuneration, or a desire to gain the credentials needed for another career such as research or writing best selling novels.

2. Medical Student Role

One's personality characteristics and motivation to succeed in medicine often combine with the medical student role and medical school environment to lead to considerable distress. For example, the obsessive medical student who has always done exceptionally well academically and who entered medicine to save lives may well find herself completely overwhelmed with the apparently insurmountable amount of information to be read, absorbed, synthesized and regurgitated. She may live with the fear that if she cannot grasp the significance of an elevated serum rhubarb level in the presence of a rapidly decreasing serum asphalt level, then a patient may die and she will be responsible.

Studies of medical students have generally shown that their greatest sources of stress come from academic concerns, including: information-input-overload, with the fear that a lack of knowledge may lead to patient death; a shortage of time; and inadequate feedback regarding performance. Other stressors included concerns regarding personal and social relationships. Students who lived alone were found to have greater stress that those who lived with others[1-3].

A study by Huebner et al.[3] has shown that stress tends to increase as students progress through medical school. The transition from basic science courses to clinical years can cause significant stress for many students. Raskin[4] studied medical students who experienced acute psychiatric crises, usually overwhelming panic, and found that half of these crises were precipitated during the course on physical diagnosis. Typically the illness began as an acute anxiety attack while examining a patient. She suggested that these crises often began at the time when medical students were on the threshold of an important phase of their careers and found that their valued abilities were being tested and found to be inadequate. Other medical students in that study experienced acute crisis when beginning a clerkship in their expected specialties, at the point of initiating a major research study and on the first day of medical school!

Obviously most medical students do not experience acute panic episodes but exposure to the clinical setting and the realities of medicine can cause significant distress to a number of students. Huebner et al.[3] found that female medical students had less stress than male students during preclinical years but more during their clinical years. The apparent distress of female medical students during their clinical years may be reflective of unanticipated difficulties in interpersonal relationships experienced by these women who had previously concentrated their efforts and excelled in academic pursuits. They may not previously have had to deal as intimately

at the interpersonal level as their professional roles now demand. However, another possibility is that the female medical students are more sensitive to the interpersonal difficulties which both male and female medical students may have in their initial contacts with patients. The male students may be denying or minimizing some of the difficulties they are having. Evidence for this assumption comes from an interne who commented that his colleagues were having difficulty in their new roles and often said they wished they could just get on with their jobs of diagnosing and treating diseases without having to worry about the frills of doing things like talking to patients and families.

Other sex differences noted between male and female medical students included the fact that women students found that a lack of female role models in medicine was one of their biggest problems. They also mentioned a shortage of time for family and friends, and difficulty in determining acceptable levels of academic and clinical competence[3]. Studies have shown that when female medical students drop out of school it is more often because of role conflict and social reasons whereas males usually drop out because of academic failure.[4]

The difficulty of a lack of appropriate mentors is certainly not limited to female medical students. Even in my somewhat limited contact with medical students at the University of Toronto, I have heard a very real concern about an apparent lack of available mentors and questionning about how one finds a mentor, especially in these days of shrinking residency programmes. Students are acutely aware that whether or not they have a mentor might well influence their acceptance into the residency programme of their choice. This concern was evident among second year students and may well increase in later years. The students who seemed most acutely aware of the need for and lack of mentors were those who were attempting to develop a life-style which included more than just the practice of medicine. These were students who wanted to explore ways of integrating marriage, family, physical exercise and other interests with work in their lives. They realized that effective stress management required the integration of these other factors, yet they were also aware that their clinical teachers, who might have sacrificed pleasure in these areas of their own lives, might not share their values and might not wish to sponsor or serve as mentors to them.

3. The Hospital Environment

The clinical environment can present both the medical student and the physician with numerous potential stressors perhaps in the presence of considerable personal satisfaction. Learning to integrate all of the information one has struggled to acquire and to apply it in particular clinical situations is hard but to be able to go beyond the theoretical and into the personal, to provide effective care to an individual person can be most difficult.

Patients come in all shapes and sizes, with a multitude of personality types and widely divergent life styles. For example the medical student may find himself overwhelmed in learning to deal with demanding, manipulative patients who make one feel helpless; educated consumers who do not want to deal with medical students and who may cause one to feel totally ignorant; dependent patients who cause one initially to feel needed and then to feel "used"; sexually attentive patients who may arouse a lot of unexpected sexual feelings; and dying patients with whom one might identify, want to rescue and grieve when they die. A resident said "the first cancer patient I saw had advanced breast cancer... She was 24 and had a new baby. I was 24 and had to give her poisons. I wondered about why we were each in the position we were."

Because of their disease, patients and their families, are often under considerable distress and their anxiety may be displaced onto medical students or physicians. As a senior physician said of the ICU environment:

> "The nature of the disease puts a lot of stress on relatives. Almost always the disease is life-threatening and unexpected. Families are unprepared and react with anger, anxiety and fear. This creates an atmosphere in which there is the feeling that you have to do something to create a favorable outcome even when it is not possible to do this. This creates a real atmosphere of tension."

Although most medical students and physicians are concerned with certain stressors which evolve from patient contact, they more often voice distress over various aspects of "the system." This involves complaints about living up to unrealistic expectations, dealing with role conflict, and politics.

> An interne said "My major source of stress is that I have no control over my environment. Lots of times I vow that today will be different. I'll run like hell and get exhausted so that I have trouble if an emergency develops. I'm at the beck and call of everyone - doctors, nurses, admitting and switchboard.
>
> It's weird to think that all internes who go through this hospital must have the same experience. Everyone winds up being tired and bitchy. It just isn't optimal health care. Things get missed - they aren't necessarily serious but in this environment you have to keep on top of things. People are generally conscientious because they are professionals, they really care or are too guilt-ridden to make mistakes. But if you have too much work to do or are in too bad a mood patients wind up geting more cursory treatment than they should get."

Many of the physicians interviewed spoke of the difficulty of handling the multiple roles involved in a teaching hospital system. While they received great satisfaction from doing clinical medicine, research and teaching these multiple roles could cause them considerable difficulty.

> "Doing only one job is OK but in addition to patients and research you have to take care of students, your lab, publishing and letting your colleagues know what you are doing, getting money for research and meeting one deadline after another. The deadlines make you work harder but drive you crazy. You're working with three deadlines then someone wants one more thing and you explode. I rough people up now and again because of that.
>
> It becomes a matter of if you run the operation and you don't have people to delegate the work to, you do too many things on your own and you just run out of time."

If one does not manage to combine all these roles however, one may find oneself squeezed out of the system, perhaps with devastating results. A physician in a community hospital

who opted out of the teaching hospital system spoke of a recent experience which had made a great impact on him.

> "Recently a patient showed up in Emergency. I looked at him and he was my former professor of clinical internal medicine - he was the one we all went to when we wanted to know how to really examine a patient and do a differential diagnosis. I hadn't seen him in a few years and here he was with his first heart attack.
>
> He was no longer in the medical center but had set up a practice in a local community. It seems they got a new Chief of Medicine who said 'If you don't publish and do research you're out.' They let him go after 22 years.
>
> He told me the story as I examined him. He said 'What does clinical medicine mean anymore.' This was a vibrant, active, excellent clinician the last time I saw him ten years ago. He laid there in front of me — a different man saying 'Can you believe they let me go after 20 years?'
>
> You read the garbage in the journals. You know lots of it doesn't say very much. Is it worth it?"

Finally, the politics of the hospital system can present numerous problems. Medical students may experience considerable stress when experienced clinicians mock their lack of knowledge and publically humiliate them with difficult questions. However these same clinicians may themselves experience considerable stress in the presence of younger residents who have a wealth of book knowledge about the latest treatments. The rivalry between age groups can be amusing to witness if, of course, one is not a part of it. Each physician must decide for herself how to handle it. One middle-aged physician recounted his approach.

> "My fellow said to me, 'You never believe anything you read in books.' My response was 'That's not true but I don't change my tried and true approach just because I've seen something new in a book.' I get around and I meet these authors and they tell me 'I had to put something concrete down to get it published but it doesn't always work this way and there are lots of other ways that work too.'
>
> So I do what works, I read and I look up what information I feel that I need to know. The difference with the resident is that he wants definitive answers and he'll change his approach that works because he's not confident enough in himself and always wants to seek out the 'experts' with the 'real answers.' "

Among peers the pressure to succeed can be great, but too much professional success can expose one to considerable professional jealousy. As one surgeon said "The politics of medicine is my greatest problem. It's dealing with the personalities of other people who don't understand what you're trying to do. It's dealing with light weights with lots of professional jealousy at a time when I can't work any harder and I am getting along with my research." Professional competition and jealousy can add to the sources of stress arising from interrelationships in the hospital environment.

Signs and Symptoms of Stress

The symptoms of stress are varied and most of us will experience numerous symptoms at different points in our lives. Usually each person has a few danger signs which serve to trigger a warning that the stressors of life are getting out of control. If you find yourself having several of the following symptoms, beware:

1. Physical

   General malaise
   Sleep disturbances
   Psychosomatic complaints

2. Psychological

   Excessive impatience, irritability
   Denial of all problems and an attempt to appear "normal" which may result in a frozen bewilderment and inability to understand or learn
   Conflict-laden dreams
   Personality changes
   Indecision
   Professsional and social isolation
   Increased use of alcohol and drugs
   Persistent overwork and fatigue
   Lack of enthusiasm about work and life in general
   Depression
   Boredom and cynicism
   Sense of omnipotence with a sense of being unappreciated
   Denial of feelings
   Decreased or markedly increased libidinal drive
   Suicidal thoughts

3. Occupational

   Guilt over taking time off
   Inability to detach from work
   Dehumanization of clients
   Impaired performance, repetitive accidents, absenteeism
   Loss of previous efficiency and reliability

4. Social

   No time for family and friends
   Marital problems
   Family problems[6-9]

Physicians and medical students both reported that their relationships with families often deteriorated when they experienced considerable stress at work. A male interne said "I don't bring the anger and frustration that I feel at the hospital home to my kids but I do bring my fatigue home so the kids don't get as much read to them."

Several physicians spoke of the role conflicts they experienced when their professional and personal lives were in conflict. A young female physician said:

> "My expectation of myself is that I can do all things at the 'supermum level'. I feel guilty when I don't spend enough time with my kids and when their time isn't so hot because I'm over tired.
>
> Recently I had a big speaking engagement in London. Wouldn't you know my kids school play was booked for the same time. I couldn't give up the speaking engagement which was booked six months before, but it's hard."

A surgeon:

> "You need to base everything on priorities and it's hard to keep kids a priority. I have lots of evening work so you keep putting off spending time with kids until tomorrow

and there's never time tomorrow. Often even when I'm with my family I may be preoccupied psyching up for a big operation tomorrow. Then I work so hard that when I'm off I want to do what I want to do and that causes problems when it's in conflict with what they would like to do."

A pediatrician:

"You project unrealistic expectations onto kids, then you aren't around to implement them but are shattered when the kids don't turn out to be what you want them to be."

Coping With Stress

One of the most important concepts in effective stress management is that many successful people enjoy functioning with a reasonably high degree of stress and enjoy meeting challenges. Problems develop when one feels she no longer has any control over life, symptoms begin to mount, relationships deteriorate and one feels unable to cope.

The way to begin to deal with one's stress level is to take some time to look at both long range and short range priorities in life. Medical students who sacrifice all outside activities and relationships to do well in school are going to find that this can easily become a life pattern. With the great ability to delay satisfaction that many physicians have, one can easily find oneself putting off until tomorrow spending time to build a relationship, but tomorrow never comes.

Dr. Merv Vincent, a psychiatrist who directs Homewood Sanitorium, has considerable experience in doing psychotherapy with physicians and their spouses. He warns that any physician who uses his or her profession as a security blanket, thereby neglecting other relationships, must be aware that more than one security blanket is needed in our cold Canadian winters. No profession can meet all of a person's needs all the time and medicine is no exception. When patients die, when you make a mistake, when you wonder what ever made you think of going to medical school, it's good to have someone with whom to share these concerns.

Remember, however, that sharing implies reciprocity. A physician who sees outside relationships as one-sided ways of getting back all the attention he gave to patients all day may soon find himself alone or in a destructive relationship. One doctor for example found his spouse overspending the family budget to compensate for never having time with him; others found that their children acted out in such a way as to demand attention by school failure, drugs, problems with the law etc. Structuring time to relax and enjoy being with family and close friends is essential to successful stress management.

As medical students, the problems experienced by senior physicians may seem quite removed. Most medical students are not even married, let alone involved in raising children yet the patterns that are developed now often set the stage for later difficulties. Learning to set priorities so as to have some "free time" is essential. Despite work overload and heavy time commitments it is important to diversify your interests and to have areas of your life apart from work or school which provide an incentive to put books aside for at least a certain period each day or to leave the office at the end of a busy day. Having a "defusing time" to play squash, run, walk, or spend leisure time with friends and colleagues can be very helpful in decreasing work-related stress. Taking time to mature relationships with others both in medicine and in other professional areas can give one the perspective that the stress which you are experiencing is probably not a sign of your own inadequacy, rather, it is a response to factors inherent in the student role, the medical student role, the professional woman role etc. Support groups with people of similar interests are often helpful in being able to provide insight and guidance provided that they don't simply degenerate into bitching sessions where people never get beyond sharing their sense of helplessness with the organizational structure.

Finding role models who appear to integrate many of the same values which are important to you and spending time talking with them informally and learning how such people resolved some of the same problems which you now confront can be quite helpful and may prevent some needless suffering. Such role models may be able to serve as the mentors who are often crucial to a successful professional career. In order to develop a relationship with a mentor, however, it is first necessary to have some qualities which make you worth noticing. Take some time to figure out what these qualities are in you and to figure out how you'll develop the assets you have.

Assess what it is that you are looking for in medicine and ask yourself the question "What do I want from my profession and my life?" at least a few times during the next few years. One physician said "When I'm under lots of stress it's helpful to say to myself 'Why the hell am I doing this in the first place?' If I come back saying 'because I enjoy it' then it's my own bloody fault."

Assess the type of life style you want when deciding which branch of medicine you'll choose and where you'll practice. Remember that there is a life outside of the University system which may be worth exploring. An internist from the east coast who practices in a community hospital, writes books, hosts a television programme, finds time to sail, play tennis and plays with his kids said:

"You have to look at how many people can be chief in a teaching hospital. A guy could go to Kansas and be boss but he doesn't want to leave the big gray building. He likes the rigidity of the teaching hospital system. His identity gets tied up with it even though he has to moonlight a day and a half a week to support himself. He could be in a wonderful situation in a community hospital but he's afraid to leave the teaching center."

Wherever you practice attempt to develop some area of your professional life which can provide you with "special treats" and try to prevent getting stuck in a professional rut. The "special treats" doctors interviewed spoke of were: research, organizing clinics so you get to see some of your "successes," making a point of finding something likeable in each patient you see (if you can't find anything maybe the physician/patient match is wrong), developing a subspecialty interest, working part time in student health centers, being a "flying doctor" in Australia etc. Structure this special interest area into your professional schedule as a reward to yourself for some of the more tedious tasks you have to perform.

(Continued on p. 24)

MEDICAL EDUCATION

Stress and The Medical Student

Jennifer Jaco 8T4

Stress in its many and varied forms is an unavoidable part of life according to many authors. Different forms of stress include physical stress from without (e.g. the weather), or within (e.g. illness), and emotional or psychological stresses such as relationships and... exams.

The kinds and amount of stress to which we as medical students are subjected, here at U of T, are all too often detrimental and unnecessary. Some of these we create ourselves and others we have little control over. In the first case we need to understand what causes the build-up of these psychological pressures so we can try to alleviate them before they become a problem. For both self-induced and externally caused stress, we need to learn how to cope so the stress will have the least possible detrimental effect for the shortest duration.

Upon entering medical school we join a select group of people. By the nature of the selection process we are supposedly intellectual, hard working, caring, and the "best" of all those who applied. Once having joined this group we are no longer compared to high school or Arts and Science students. We are now compared to all the other super-student wonders (like yourself!). It is no wonder that in first year many students are appalled at being average or below average. Rather than accepting this statistically not too surprising fact, they create for themselves a state of excess anxiety by trying to beat the class average.

This, and other situations in which we have a lot to do with the amount of perceived stress, occur when we lose perspective on where we are in the learning process. A second year medical student's job is to try to be a good second year medical student. That is, to study and learn pathology and history taking at a level appropriate for second year. The objective is not to be as efficient and as accurate as the teaching clinician who has ten years of experience.

One could easily argue that "a man's reach should exceed his grasp", however, in the context of acute stress, a reach which is inappropriately high can do nothing else but undermine a person's ego and cause anxiety. Perhaps the profs who make up the exams believe in reaching too high since what they try to extract from us all too often seems trivial and out of perspective. Exams also cause unnecessary stress when scheduled inhumanely. Peer pressure and mass hysteria tend to escalate stress perception. Of course along with all these medical school-related stresses, we have to cope with the usual problems of living and dealing with people in romantic relationships, within families, and as friends. These relationships can often be strained when medical school stresses get out of proportion.

Other adverse reactions to stress range from increasing use of alcohol and drugs, indifference to school, withdrawal from social responsibilities, frank depression, thoughts of quitting, and sometimes thoughts of suicide. Obviously all of us have experienced some of the bad effects of exams, otherwise we wouldn't complain about them so much. Hopefully though, we can limit those bad effects to minor things just around exam time, and not throughout the whole year.

The first step in coping is to hold onto a proper perspective of what we should be achieving. To help us, we all need support from our peers, to reinforce that we are all in the same boat, having the same problems coping. We also need support from outside of school in the form of good friends or family. Hopefully these people will remind us that medicine is important, but shouldn't ruin the other aspects of one's life. We should try and have a healthy social life, neither hiding in our books nor in our beer glasses. Maintaining an involvement in sports, clubs, or individual activities should help in achieving these aims. When is the last time you read a novel instead of Harrison's? This author believes that a healthy transit through medical school is possible only with a healthy involvement in all aspects of life. □

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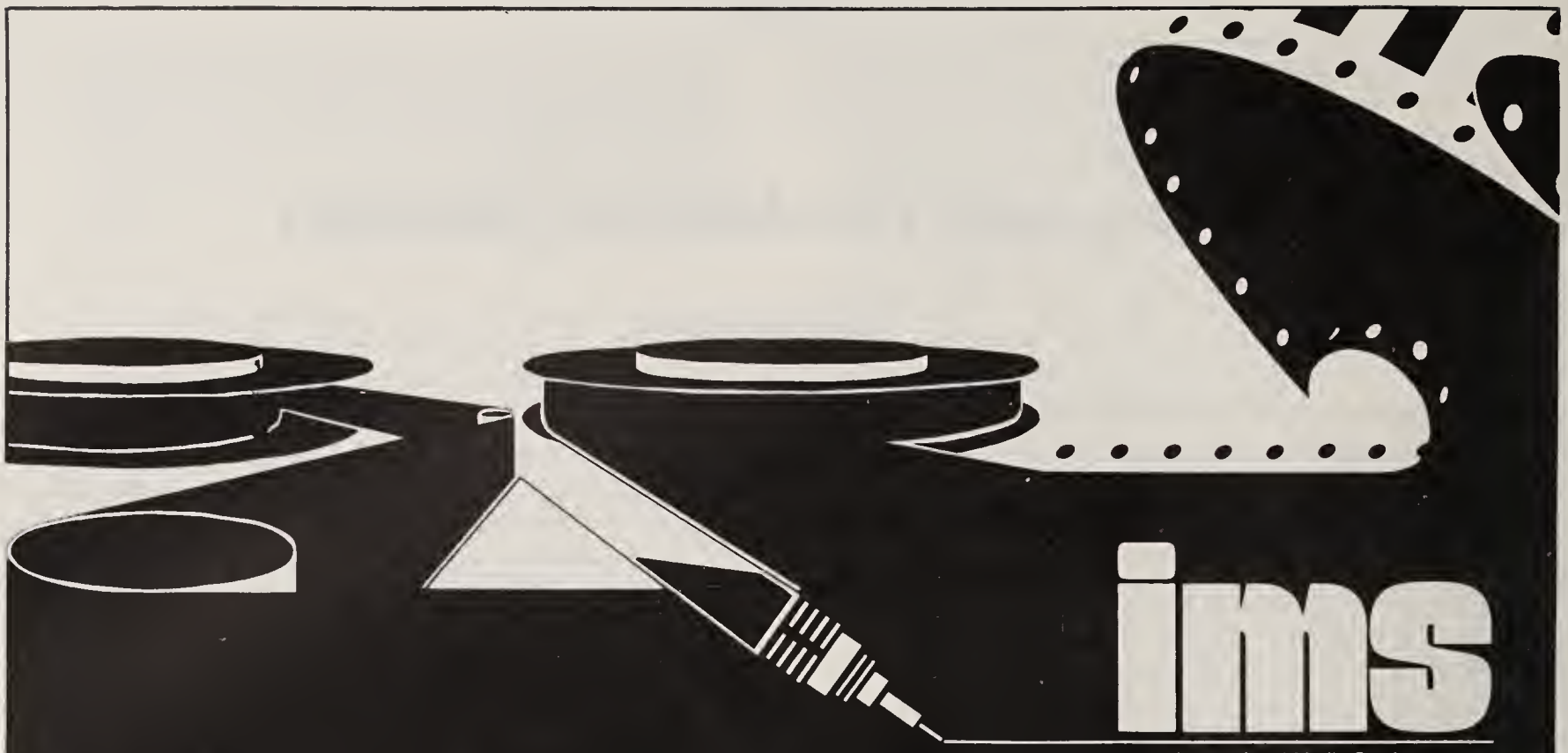

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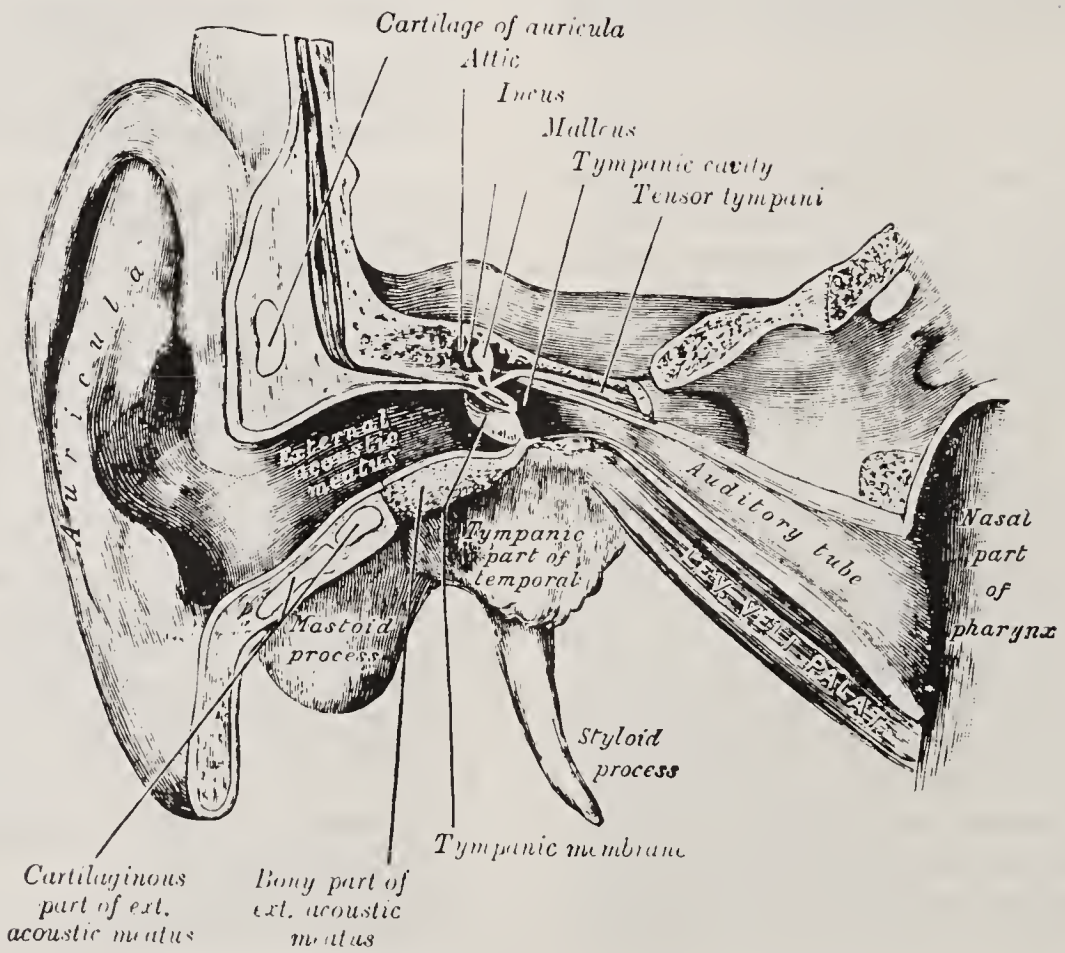

MEDICAL EDUCATION

Women in Medicine: Stress and Stereotypes

Lisa Sheinin 8T5, Cyntha Lazar 8T5, and Debbie Sheinbaum 8T5

Throughout the four years of medical education, both men and women face many significant stresses. Women, however, must deal with additional pressures which have prompted them to devise unique coping mecanisms.

With increasing numbers of women in medicine it has been noted that: "It seems likely that the kind of discrimination which persists will not be of the gross variety which denies women a medical education but of a subtler variety, based on what has aptly been called the 'micro-inequities' of daily life".[9]

One of the most insidious forms of discrimination, propagated by both staff and students, is the prevalence of the outdated female stereotype; as evidenced in pornographic slides, pin-ups, sexual jokes and innuendos.[15] "Women students are still harassed in the classroom in numerous ways and pay the price in damage to self-esteem, anger, and rage".[9]

This is compounded by the absence of women in professional and administrative positions. Roeske has postulated that "contact with female role models would help reduce the emotional distress experienced by female students".[18] Konanc has found that faculty support is essential.[15]

The manner in which women view themselves may intensify their anxiety. Many female medical students begin training with negative perceptions of their capabilities,[9] equating women with incompetence. As a result they feel they must prove themselves to receive positive feedback.[15]

Loneliness and isolation are experienced to a greater extent by women than by men.[14] In subtle ways women feel unwelcome in medicine, "feeling like an outsider, excluded from the sports discussions, sexual wise-cracking, and heterosexual flirtatiousness that led to comradery among the male physicians".[15]

Due to society's expectations of women, the female medical students experienced more role conflict.[17] Many anticipated difficulty in combining career and family responsibilities.[15] Worsening this conflict was lack of support for their career decision.

It has also been found that certain adaptive mechanisms for stress were used predominantly by women: managerial skills "to integrate the plural nature of their lives into a fuctioning whole"; realistic self-appraisal; flexibility/adaptability, willingness to seek professional help and ability to accept that help.[13]

In a study of first year medical students it was noticed that although women and men entered with similar levels of psychological adjustment, women were significantly more troubled by midyear. By the end of the year they had called upon their adaptive resources to cope with these stresses.[17]

Numerous studies have found the need for support groups for women.[6, 8, 9, 11, 15, 17] It has also been advised that "rather than leaving their existence to chance, medical schools should make provisions for them in the first year curriculum".[6]

Committees, such as the Joint Committee on the Status of Women at Harvard and the Office of Women at Yale, have been established in aid of women. It is vital that the faculty voice their approval for these organisations so that women will not fear reprisal. Perhaps the time has come for the University of Toronto to follow their lead.

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(Continued on p. 11)

MEDICAL TECHNOLOGY

The Application of Computers in Medical Information Systems

Paul Marks 8T6

Much of medical practice involves processing information. As physicians are able to formalize the relationships among symptoms, diseases and treatment, they will be more able to use computers to help deliver medical services to people. Computers and the information systems built around them will be directed towards developing improved methods for the prevention, diagnosis, treatment and management of disease.

The essence of medical practice is to collect information, evaluate it, and then make decisions. Only after the information is processed can the doctor treat the disease. A computer may assist a medical practitioner by storing and accessing the important facts. Computers can speed communications, distill information, and safeguard against human errors. Computers can also reduce the time a patient must spend in the hospital by helping with the data-collecting routine prior to his entry.

Computers can automate the process of collecting information from the patient. One automated medical data collection system developed at the Mayo Clinic uses a display terminal to present a series of questions. Patients enter their responses on the display terminal with an electronic light pen. Computer-administered questioning permits the effective use of question branching. This means a questionnaire can be tailored to the individual patient, so that factors such as sex, age, education, and ability to understand questions can be accounted for. Moreover, the patient answers only those questions which pertain to his own medical problems.[1]

Pictorial techniques also allow the patient more freedom of expression. For example, the display terminal and light pen permit him to specify the location of pain. The patient responses are condensed into a concise summary statement for the examining physician. In one test, the automated medical history system obtained approximately 95 per cent of the information normally recorded by the physician.[2]

Patient response to automated medical history-taking has been quite favorable. In the case of the experimental systems, the patients were asked whether they would prefer to give the history to the machine (as they had previously done), to a physician, to a nurse, or whether they have no preference. They were also asked to indicate whether they thought the history was complete, incomplete, interesting, dull or difficult to understand. Although over half the patients expressed no preference, it is of interest to note that of those who did express a preference, the machine was favored over the physician by a margin of approximately three to one. Almost all the patients stated that they found the automated history interesting.[3]

After information about a patient is developed and recorded in an automated medical history system, it is used to provide a printed summary output for the physician. The information can be retained in the computer storage for subsequent retrieval. The accumulation of large masses of medical data has led to the development of medical data bases.

An example of this is the POMR (Problem Oriented Medical Record).[4] This medical record system consists primarily of a well-defined "data base". The information is stored in the memory in layers, each with more detailed information. There are three levels now, but this can be expanded. The first level has basic identificaiton, the second, such critical medical data as drug allergies, vaccinations, and past illnesses. The third layer covers hospital visits and X-ray information. A person's records can be obtained by reference to an identification number, his name, or just his physical description in an emergency. Only hospital staff members with a "need-to-know" status have keys that can turn on the display terminals which in turn are coded to the computer by locations. The X-ray department, for example, can get only X-ray information. Such personal information as psychiatric treatment can be obtained only by certain physicians, who must insert a special code number into the machine. The computer keeps track of those who requested such confidential displays which allows a record of information requests.[5]

In the future, it is possible that a centralized computer data bank will be developed which will contain the medical histories of an entire population of a city, a state or even a nation. Plans are underway to develop such a bank in Jerusalem, Israel.[6] The data bank is being used for individual patient treatment, for the development of community health profiles, as a population register, and for the study and control of epidemics.

A computer in a hospital can be used for retaining the records of patients, for optimal scheduling of clinics and wards, for accounting services, for automation of a clinical laboratory, and for physiological monitoring. It has been estimated that twenty-five per cent of the total operating budget of the average hospital goes to the recording, handling, and sorting of medical information by nurses.[7] A hospital information system using a terminal input to a computer should reduce the cost of information processing and storage. Automated ward record-keeping systems are currently being developed. Automated patient records will some day be available to even the remotest small hospital on a time-sharing basis.

The development of medical data bases will assist the medical practitioners in the delivery of health services. The delivery of the best attainable health services is a major national concern and a major economic investment. Automation of medical information is necessary to process the information necessary for the task.

Of course, there are inherent advantages and disadvantages to using an automated system. The main justifications for turning to automated systems for collecting historical information from a patient are time factors, standardization, accuracy, and overall health service effectiveness.

History-taking demands a significant portion of the clinician's time. Information gathered in a computer system can be used not only for the patient's immediate needs but also for other services such as scheduling visits. Uniform and consistent wording and selection of questions is possible with an automated approach. The variability of the interviewer is eliminated since the response of the clinician to the patient may influence the whole sequence and content of the interview. The computer may produce a legible case record in contrast to the quality of many written records. The personal or intimate nature of the information being sought, for example in gynaecology or alcoholism, may lead the patient to prefer a less personal approach.[8]

The disadvantages of using computers include security problems, recovery, accuracy of data, potential lack of privacy, costs, and patient reluctance and inability to enter data.

In terms of security the system must protect the data against unauthorized disclosure, alteration, or destruction. If there is a system failure the data must be recovered. Integrity of the data includes ensuring that the information used is current and accurate. A major concern is privacy, and the right of individuals to determine for themselves when, how, and to what extent, information about them is to be transmitted to others. A third factor is that a complete automated medical information system may not be cost-effective and thus unfeasible to install. Finally, if the patient is not capable of entering information into the system, then alternative procedure will have to be followed.

Computers are, therefore, becoming increasingly important in the practice of medicine and the delivery of health services. The need for effective management of health data is important for financial and health information reasons. The handling and storage of health records must be increasingly automated in order to avoid a paper-work crush. A computer will be able to assist in providing more effective tests, diagnoses of disease, and hospital care, hopefully at reduced costs to the patient. Computers, perhaps on a time-sharing basis, will become part of the equipment necessary for medical practice and hospital operation. □

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Editor's Note:

Students wishing further assistance in coping with stress can contact the Student Health Service at 256 Huron St. or the Psychiatric Service at 2 Bancroft Ave. Both are staffed by friendly and competent professionals and can be approached independently. Both of these services are *absolutely* confidential, and no information can be released to any authority without the express permission of the person involved.

Student Health Services can be reached between the hours of 9 AM and 5 PM at 978-2459 (for men) or 978-2456 (for women). During off-hours (5 PM to 9 AM) the number is 978-2458 (both men and women). The number for Psychiatric Services is 978-2441, and they can be reached during regular office hours. Please feel free to contact either, in confidence.

Michael Dan
Nanda Gopinath

ENDOCRINOLOGY

Sparganum Growth Factor: A Clinical Alternative to Growth Hormone?

Douglas Kondziolka 8T5
Vance Yeomans 8T5

In the past, the only practical use of a tapeworm to man was as an extreme weight-loss mechanism. Presently, one worm, *Spirometra mansonides*, is seen in a new light. It produces a substance, Sparganum Growth Factor, which has activities in mammals similar to growth hormone, thyroxine and even insulin. The clinical importance of the factor lies not only in its applicability to the treatment of some pituitary insufficiencies or hypothyroidism, but also in its being the only known alternative to growth hormone.

For the patient presenting with the signs of growth hormone (GH) deficiency, various avenues of treatment are available. There may be a lack in pituitary viability or in GH receptor number. Possibly, formed somatomedins may be defective. In cases of GH deficiency proper, modern treatment involves the use of GH isolated from pituitary extracts. However, this extract is not available in abundant quantities and patient waiting lists are common. As one endocrinologist explained, "there's not enough for every short kid who wants to play basketball."

Sparganum Growth Factor (SGF), a relatively unknown, though by no means new protein group, holds amazing potential as the GH replacement of the future. Found in the head (scolex) of the juvenile stage of a tapeworm, *Spirometra mansonoides*, SGF is amazing because of its invertebrate origin. Well established is the fact that GH works downward in animal phylogeny, but not upwards. For example, human GH may work in a dog, but dog GH cannot work in a man. To suggest that a protein group of invertebrate formation holds GH properties in mammals seems absurd.

SGF Activity

SGF has a molecular weight of approximately 70,000 Daltons. It is not known whether it is a combination of proteins with individual properties or a single protein with multiple properties. The factor is secreted at the host-worm interface and is not extracted from worm homogenates. It is non-dialysable and is not excreted in urine.[1]

The physiological properties of SGF and GH are similar in many respects. Thorough studies have been undertaken in mice and hamsters. Intact rodents, when infected with spargana (juvenile tapeworms) of *S. mansonoides* show a smooth and gradual increase in weight over that of controls and this advantage lasts over their lifespan.[2] They undergo true skeletal growth; the increase in weight is not due to obesity, nor is it due to worm mass or tissue reaction.[1] Examination of their carcasses shows essentially normal composition with just a slight increase in fat.[4]

However, growth is not limited to the skeletal system. Development involves "increases in body, thymic, liver and kidney weights, as well as stimulation of bone size and epiphyseal cartilage."[4] (Figure 1)

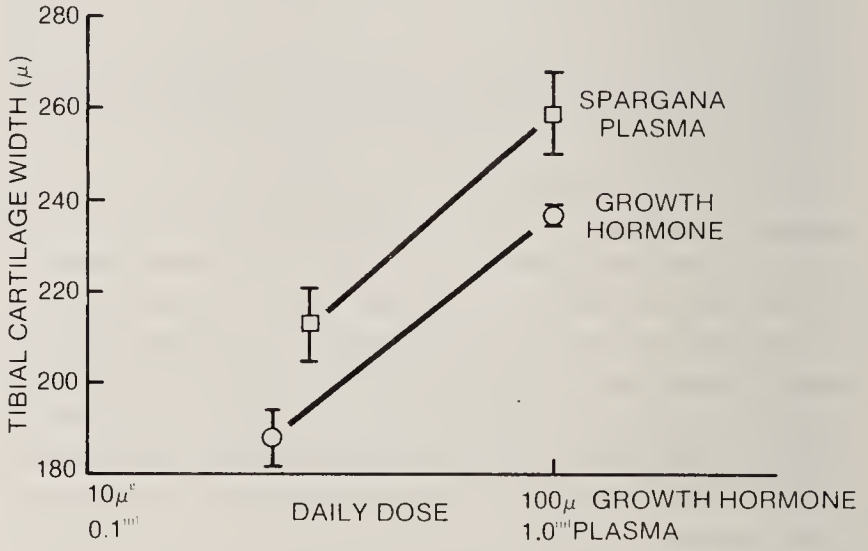

Figure 1. Comparison of the dose-response curves of bovine growth hormone and plasma from spargana-implanted hypophysectomized rats. From Steelman et al, *Rec. Prog. Horm. Res.* 27:100, 1974.

The most startling and reliable effects of SGF are those observed in hypophysectomized (hypox) and thyroidectomized rats. These rats are unable to grow due to a lack of pituitary GH and thyroxine. When such animals are injected with a few scolices of *S. mansonoides*, the rats begin to grow within 48 hours and continue to grow at a rate which often exceeds that of a normal male rat.[2]

In intact male rats there is no obvious effect of the SGF, probably because these animals are actually growing at their biological limit.[2] The plasma of these rats, however, shows SGF activity equivalent to that of the hypox-implanted rats.[4] There is a negative feedback mechanism which causes, in the intact rat, a reduction in pituitary wight of 37% and of plasma GH levels of 68% within ten to twenty days.[1] Thus it is

apparent that the normal pituitary recognizes SGF as a functional equivalent to GH. The pituitary rebounds after 3-4 weeks, possibly due to host development of immunity to SGF.[1] Immunological tolerance is essential for the factor to operate.[4]

Most worm-implanted hypophysectomized rats doubled their weight in four to six weeks.[1] However, one in four rats will continue to grow, possibly exceeding their starting weights by three to seven times.[2] (Figure 2). In most cases, a growth plateau is reached due to host antibody production neutralizing the SGF. The plateau is not due to an exhaustion of host reserves, because an injection of bovine GH will quickly cause growth to resume.[1]

Figure 2. 6 month post-hypophysectomized rats. The larger rats received 20 scolices of *S. Mansonoides* and outweigh the controls by 3 or 4 times. From Mueller, J., *J. Parasit.* 60(1):9, 1974.

SGF - An Insulin Alternative

Another unusual property of SGF is its effect on rats rendered diabetic with Alloxan, which works to destroy pancreatic beta cells. Such diabetic rats appear rough, lose weight and go into decline, but when implanted with spargana they recover their sleek coats and resume normal growth.[2] SGF is not a complete cure however, because the subject remains hyperglycemic.

SGF - A Thyroxine Alternative

SGF has also shown impressive results in the management of thyroidectomized rats. In thyroidectomized rats infected with spargana, growth responses were comparable to those of thyroidectomized rats with daily injections of 2 μg thyroxine per 100 g body weight.[3] Infected rats utilized their food just as efficiently as intact controls. The worm does not cause extrathyroidal thyroxine synthesis, nor does it produce thyroxine itself.[3] Rather, SGF must contain this thyroxine-like activity within itself.

SGF is not a complete spectrum hormonal factor. It is free of gonadotrophic effects, as shown by the lack of sexual development in young hypox-implanted rats. They retain the soft wooly fur and blunt muzzle characteristic of baby rats.[1]

Host Metabolism

There has been speculation into the idea that SGF may induce the formation of a *host* protein with GH-like properties. Strong evidence for this is that SGF is not isolated from worm homogenates. Where then does SGF come from? It has been shown that spargana maintained in special medium will produce a growth promoting substance in 24-48 hours.[4] This preparation, when given to immature rats, produced a maximal increase in liver ornithine decarboxylase levels.[4] This enzyme is rate-limiting in certain aspects of protein synthesis seem with elevated GH levels.

SGF also induces somatomedin formation. It is not, however, somatomedin because the latter can withstand boiling and a pH of 5.5 while SGF cannot.[1] *In vivo*, SGF incorporates sulfate into the chondroitin sulfate of costal cartilage. This does not occur *in vitro*, which suggests that some SGF actions are through an intermediary like somatomedin.[4]

There is no immunological cross-reactivity in radioimmunoassay between SGF and either human or rat GH.[4] However, SGF competes with GH for binding sites on rabbit liver cell membrane and thus there is probably some structural similarity between them.[5] The Hormone Research Lab at the University of California, San Francisco, reports[6] advances in isolation of SGF structure, although work is not yet published.

One metabolic discrepancy between SGF and GH is that SGF does not mobilize fatty acids, whereas GH does. This effect accounts for the slight increase in fat found in implanted mice.[1] This non-lipolytic property of SGF is similar to that of insulin and may help to alleviate the metabolic strain of diabetes mellitus.

Therapeutics

The administration of plasma from rats treated with spargana to other hypophysectomized rats induces rapid growth. Also, SGF remains potent even after a second transfer, a feat GH cannot match.[4] Experiments have shown that the activity in 1 ml of plasma from a hypox rat, ten days after implantation with spargana, is equivalent to the activity found in a normal rat pituitary gland.[2] This is in contrast to growth hormone, which disappears from the blood after four hours due to its dialysable 21,000 Dalton structure.[1]

The production of SGF from specific media and its ability for transfer in plasma give it great potential for therapeutic use. It allows SGF to be stored and not to be limited by the short supply restrictions found currently in GH administration.

Presently, there are limitations to the usage of spargana and SGF as GH substitutes. In all cases involving primates, no

growth stimulating effect was observed. This has been due to an immediate host immune response to implanted worms. The worm is walled off in a granuloma and stops growing. Future progress does not lie in introducing worms into humans. The ensuing problem of sparganosis and tapeworm-related anemia would overrule that. Rather, SGF itself must be introduced. A medium consisting of Mixture 199, calf serum and chick embryo extract may be the key to *in vitro* spargana maintenance and SGF production.[4] Purified SGF via this method may some day be routinely administered to patients with growth hormone deficiency.

Summary

At present, GH production through DNA recombination remains the major research thrust for overcoming GH insufficiency. However, the possibilities accompanying SGF research must be reckoned with. It is not known why *Spirometra mansonoides* produces SGF, because it appears to give the worm no real, practical advantage.

With growth hormone in such short supply, Sparganum Growth Factor provides an excellent alternative for studying the regulation of growth processes in mammals. From pure research may come an answer to this major medical problem. Who then will say that a tapeworm's only benefit to man was to help him lose weight?

Acknowledgements

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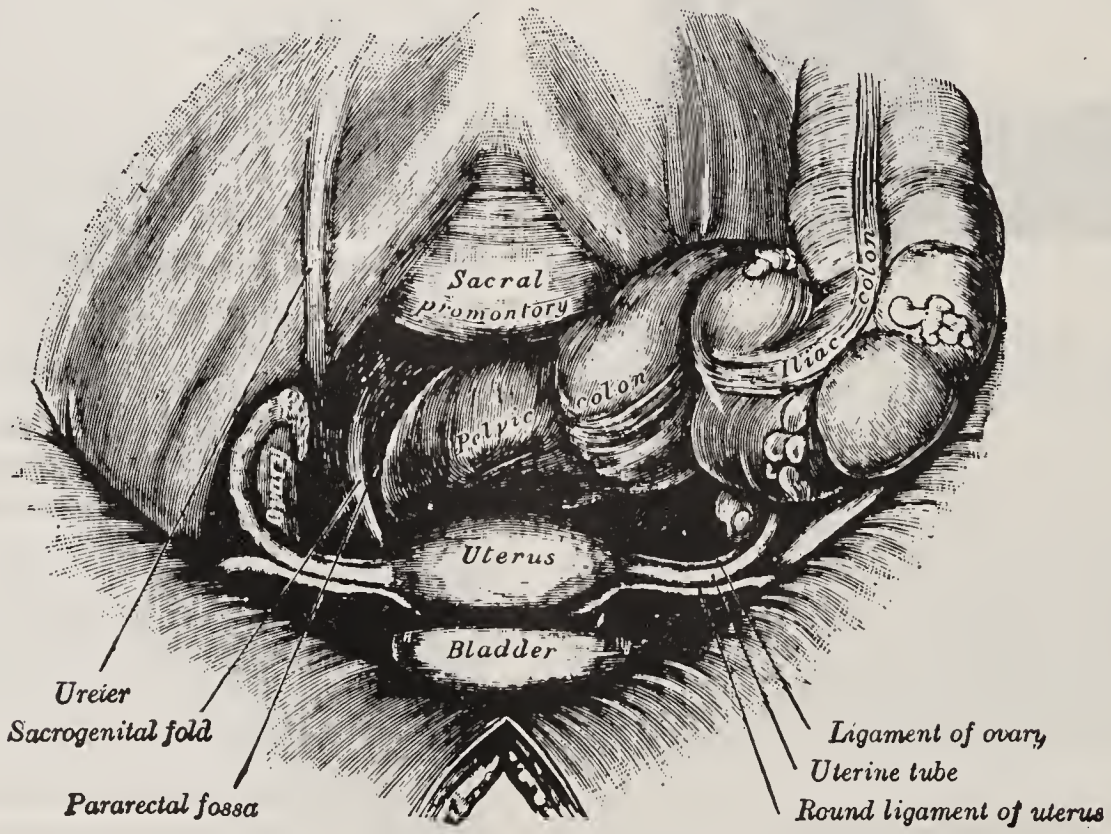

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ENDOCRINOLOGY

Pulsatile Pattern of Basal Insulin, Glucagon, and Somatostatin Secretion: a New Concept in Endocrinology?

Walter P. Van Helder, M.Eng., Ph.D. 8T4

It was reported, for the first time by Vanhelder[1] et al., that insulin is secreted during the day and night in the form of secretory bursts. This pattern can be observed in the portal, but not peripheral blood of normal, conscious dogs and seems to be independent of changes in blood glucose levels. This phenomenon is quite different from the small insulin oscillations observed by other scientists in the peripheral blood of various species. The small oscillations have an amplitude several hundred times smaller than the secretory bursts observed by Vanhelder et al. The same group of scientists at this University observed that glucagon and somatostatin portal levels also fluctuate over a period of 24 hours.[2] The liver is thus exposed to continuous fluctuations in insulin, glucagon, and somatostatin in the normal postabsorptive state. This may introduce a new concept in endocrinology as it has been previously generally accepted that in the normal fasting state the secretion of insulin is minimal.

Insulin Secretion

It has been generally accepted that at normal fasting levels of blood glucose the rate of insulin secretion is minimal. The pattern of this secretion has been described as a continuous and slow basal release.[3]

A dramatic increase in insulin secretion — in the order of 10 fold the basal one — was observed to occur within 5 minutes after acute elevation of blood glucose concentration to a level two or three times normal. If the elevation of blood glucose persisted the response of insulin secretion was described to be multiphasic.[3]

It has been known that a stimulating effect on insulin secretion could be elicited by most if not all amino acids. Even though the amino acids administered during the normal fasting level of blood glucose concentration caused only a small increase in insulin secretion, their effect was considerably potentiated when they were administered in the presence of elevated blood glucose concentrations.[3, 4]

It has been suggested that various hormones such as glucagon, growth hormone, cortisol, somatostatin, and others could modulate the basal insulin secretion.[4] A modulation of this secretion was supposed to be achieved also by the autonomic nervous system.

Several years ago some investigators started the studies of spontaneous oscillations of glucose and insulin in the peripheral blood of dog[5, 6] monkey[7, 8] and man[9, 10, 11]. Ookhtens[5] et al. described the sustained oscillations of both glucose and constant intravenous infusion of glucose. No fluctuations were found in insulin concentrations when glucose was not infused into the animals.

Goodner[7] et al. observed regular synchronous oscillations of glucose, insulin, and glucagon in monkeys. The blood samples were taken from the vena cava. In a subsequent study[8] this group of investigators reported that these oscillations of insulin arose from changing secretion rather than degradation.

Studies in humans revealed small oscillation of insulin and glucose in plasma samples taken from the superior vena cava.[9, 10, 11] Stagner [12] et al. reported that insulin, glucagon, and somatostatin demonstrated regular sustained cyclic secretions from canine pancreas *in vitro*. These results suggested that there is an intrinsic rhythm of hormone secretion by the pancreas *in vitro* in spite of constant glucose levels.

In the mentioned *in vivo* studies the insulin concentration was measured in peripheral blood, that means only after insulin secreted by beta cells of the pancreas has passed the liver. It was presumed *a priori* that the pattern of changes of insulin concentration in peripheral blood reflected truly the changes of insulin secretion by the pancreas. Such a presumption does not seem to be fully substantiated. The study done *in vitro*[12] showed the function of canine endocrine pancreas in a situation which did not represent normal physiological conditions.

Even though these studies brought new valuable views especially on the insulin-glucose relations, they did not show the real pattern of basal insulin release under physiological conditions.

Hormonal Interrelationships (Insulin, Glucagon, Somatostin)

The common state of knowledge is that even small amounts of glucagon increase insulin secretion.[13] In spite of the fact that glucose regulates insulin and glucagon reciprocally, amino acids stimulate secretion of both of them.

Somatostatin was isolated and originally described as a hypothalamic tetradecapeptide.[14] Later it was discovered that it was also present in many other locations, e.g. the D-cells of the islets of Langerhans.[15] It was described that somatostatin inhibits the secretory function of the pancreas[16, 17] and decreases the levels of circulating insulin in man and animals.[4] It was also suggested that somatostatin has an inhibitory effect on the beta cell *in vitro*.[17, 18] When administered *in vivo*, somatostatin decreases blood glucose. This was explained by somatostatin-induced decrease of plasma glucagon.[16, 19]

Any attempt to describe multiple hormonal interelationships must be regarded as an extremely complex and difficult task. Studies *in vivo* face always the possibility that there exist several overlaping control mechanisms, some of which may be unknown. *In vitro* studies usually try to isolate the action of a few hormones and/or other plasma constituents, but it is possible that the experiments are sometimes done under non-physiological conditions by omitting some important, perhaps unknown inputs. This fact may significantly influence the work of the simulated system.

The Introduction of a New Animal Model by Vanhelder[1] et al.

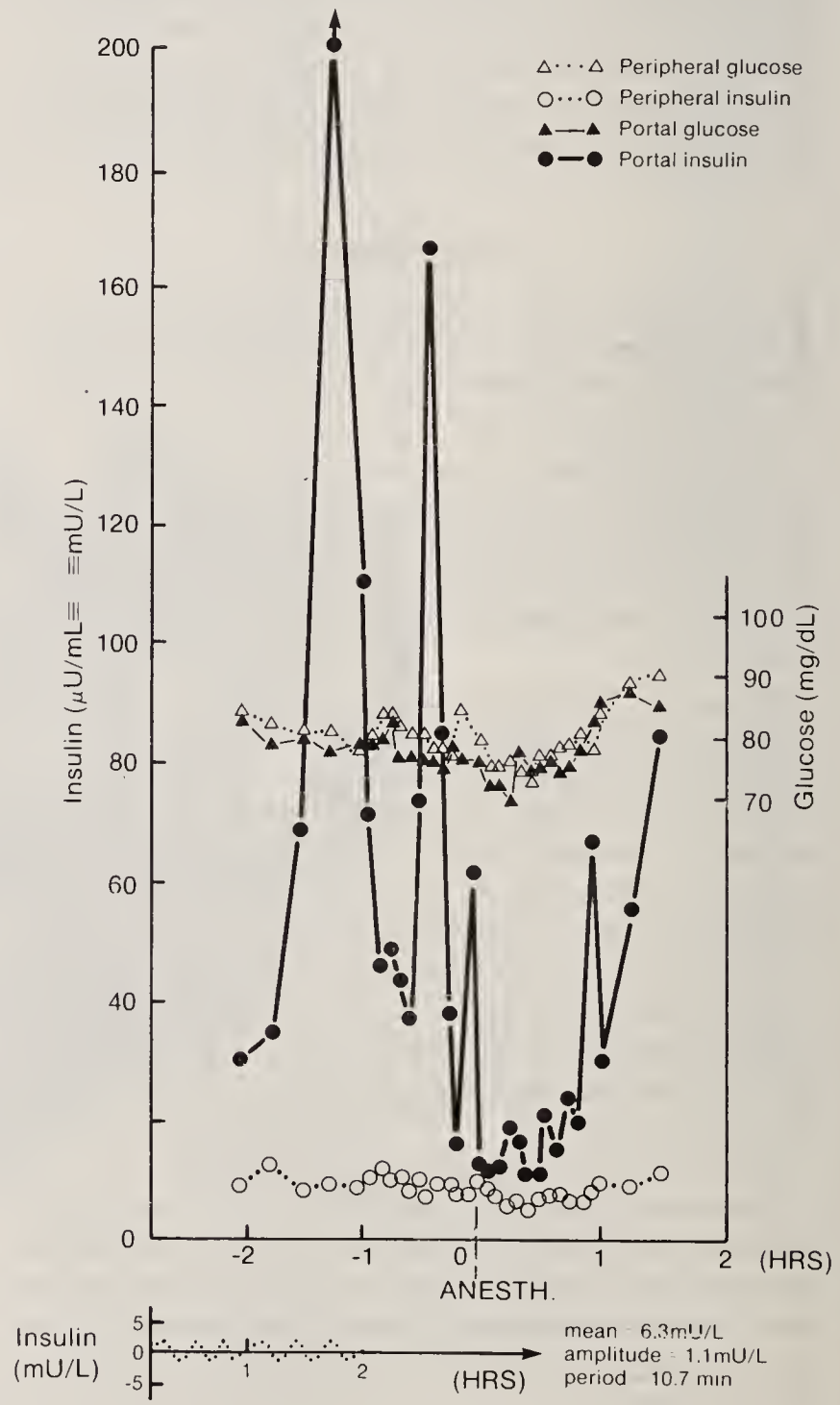
The results of the research work described previously did not give answers to the following questions: what is the real pattern of insulin release into the prehepatic circulation under normal physiological conditions? What is its relation to the pattern of glucagon and somatostatin release *in vivo*? What is the relation between glucose and all these hormones in the postabsorptive state over a prolonged period of time? Do any of these hormones have a circadian rhythm?

To commence an investigation along these lines meant taking blood samples from a portal vein before the blood carries the hormones excreted by the endocrine pancreas through the liver. It also meant sampling from conscious animals under normal conditions regularly over a prolonged period of time. It was necessary as well to take simultaneous samples for all the plasma constituents to be studied. This altogether was never done before.

Vanhelder[1] et al. used a unique animal model. Normal dogs were fitted with indwelling silastic portal catheters. Two weeks after the cathetarization, when the animals recovered, the experiments were performed. Thus the dogs used in these experiments were normal, conscious dogs following their usual 24 hr routine. They were not subject to any trauma or anesthesia during the time of the experiments. Both portal and peripheral blood samples were taken simultaneously every 15 min. for 24 hrs. The hormonal profiles (insulin, glucagon, and somatostatin) were determinded during this time period.

The results[1] were quite surprising. Large surges of insulin were observed in the portal but not in the peripheral blood, suggesting a very efficient "filtering" function of the liver. The fraction of insulin "filtered" by the liver was quite variable — approximately between 5 and 95 per cent. The surges occured several times per 24 hours, giving a period in the order of hours. The amplitude of these surges was up to several hundred times higher than the one described by other authors who reported only small peripheral insulin oscillations.[5, 11] In addition to these differences, one has to consider the fact that some of the small peripheral oscillations had an amplitude similar to the sensitivity of the method used to determine the insulin levels. For example, Lang et al.[11] reported that the peripheral insulin levels in man cycle with an amplitude 1.1mU/L — the precision SD was 0.8mU/L in their method of insulin determinations. Thus one cannot exclude the possibility that some of the described characteristics of these small oscillations can be due to an artifact.

Figure 1 compares the proportion between peripheral insulin oscillations in man, reported by Lang et al.[11] and portal insulin surges in the dog described by Vanhelder et al.

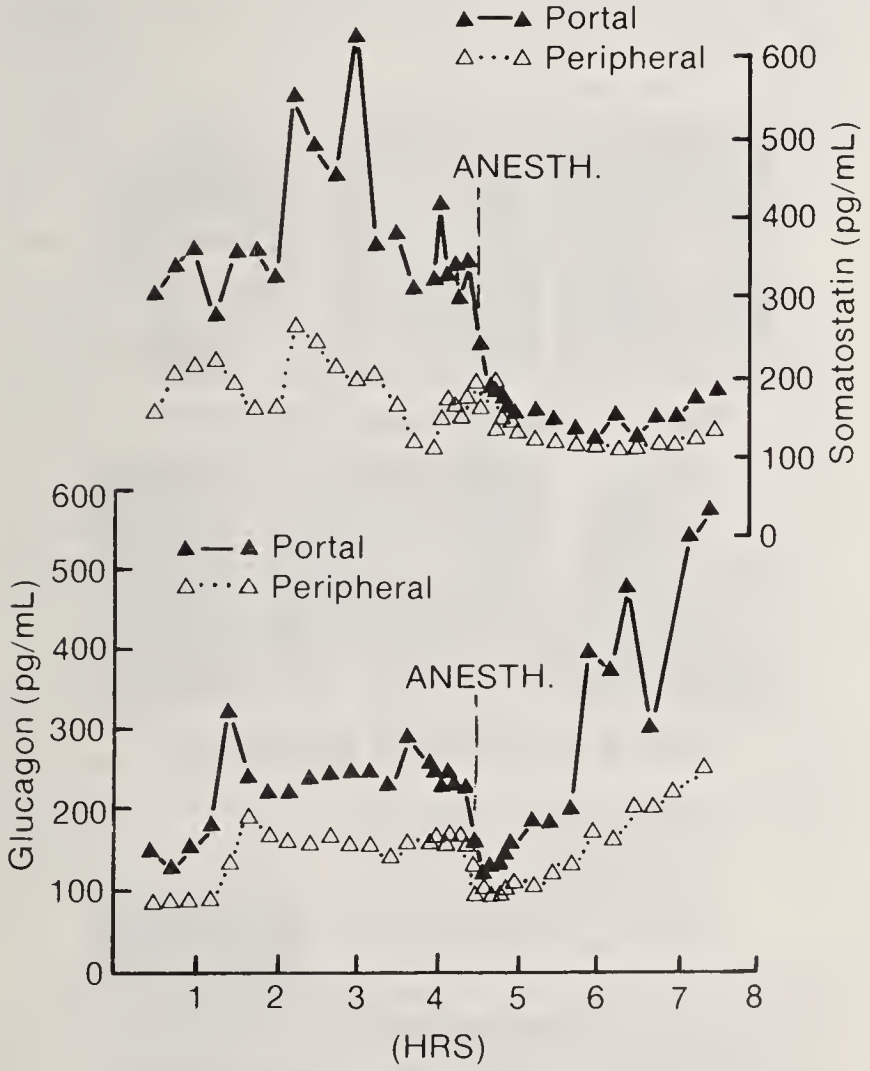


The fact that Vanhelder et al.[1, 13] used conscious subjects for the study of hormonal portal levels is quite significant. In yet another communication,[21] it was reported that the pulsatile pattern of basal insulin secretion temporarily disappeared under the conditions of general anesthesia (pentobarbital). Other investigators observed the disappearance of peripheral insulin oscillations in the monkey when halothane was used to anesthetize the subjects.[22] A similar change can be seen in the levels of glucagon and somatostatin when general anesthesia is administered to subjects.[2]

Glucagon and somatostatin portal levels also exhibit significant fluctuations.[2] Therefore the liver is subject to these fluctuations at all times. the fluctuations do not occur simultaneously and thus it is difficult to imagine that they would be caused by changes in blood flow.

The fact that the portal surges of insulin — and probably also other hormones — practically temporarily disappear under the conditions of general anesthesia is probably responsible for the failure of previous investigators to oberve these surges during "acute" experiments performed on anesthetized subjects.

Figure 2 shows an example of glucagon and somatostatin portal levels measured simultaneously in a conscious dog.[2]



The physiological significance of these hormonal surges is not clear at the present time.[1, 2, 20] Whatever their effect, it is probably quite changed in a diabetic who lacks insulin. One can only speculate that in such a case the fluctuations of glucagon and somatostatin "unbalanced" by missing insulin surges may have certain pathological effect on the diabetic subject. This would be consistent with finding that "controlled" insulin-dependent diabetics, i.e. those supplied with insulin injections or an artificial pancreas, still have a high probability of various pathological conditions. They are supplied with insulin "peripherally" and are still missing the portal secretory bursts.

The control of insulin, glucagon, and somatostatin fluctuations also remains to be detrmined. However, the fact that insulin portal surges are changed (temporarily inhibited) by general anesthesia does not contradict the reports of other investigators that electrical stimulation of certain areas of brain[23] and injections of hypothalamic extracts[24, 27] are followed by increased insulin release. This stimulatory effect was reported to be abolished by the administration of anesthesia.[28] Thus the possibility that the mentioned fluctuations are controlled by the CNS cannot be excluded. □

Acknowledgements

The author is thankful to Dr. K.H. Norwich for his suggestions and work on a mathematical model to express the obserbed pattern of portal hormonal surges theoretically.

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(Continued on p. 29)

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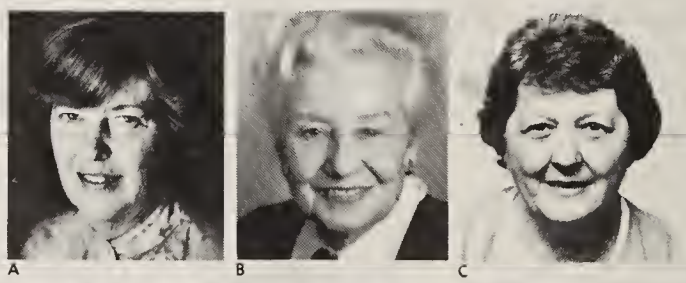

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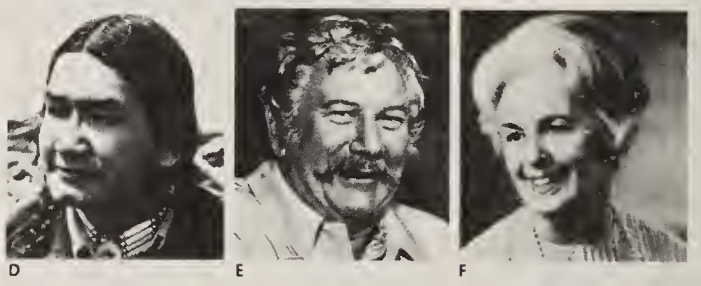

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ONCOLOGY

Small Cell Lung Cancer

Part I: A Curable Disease

M.J. Bazos 8T5, W.K. Evans, P.Y. Wang and T.T. Drakos

Small cell lung cancer is the most aggressive of the lung tumors. Recently, this widely disseminating disease has become a treatable cancer, while only a few years ago this neoplastic disease had a median survival of two months. Advances in radiation biophysics, chemotherapy, and cell biology, particularly in the area of metastases are leading to new concepts in therapy with a progressive improvement in median survival. This paper discusses small cell lung cancer, its classification and staging, the pathology of its metastases, and the problems in its treatment.

Introduction

Lung cancer is the most frequent malignant neoplasm causing death in males and the fourth most frequent cause of death in females in Canada.[1] By conservative estimates, last year alone this disease claimed the lives of over ten thousand males and twenty-five hundred females.[2]

The four major histological cell types of lung cancer include squamous cell carcinoma, adenocarcinoma, large cell anaplastic, and small cell undifferentiated carcinoma. The latter form accounts for nearly twenty per-cent of all lung cancers.[3] From these patients, approximately one-third will have limited-stage disease (*vide infra*). This means that over one thousand new patients with limited-stage small cell lung cancer are diagnosed yearly in Canada.

Small cell lung cancer, or, as it is often called, small cell carcinoma of the lung (SCCL) is a disseminated neoplasm which originates in the perihilar bronchial epithelium and submucosa of middle-aged smokers and spreads rapidly either by local invasion or by distant metastasis. Primary carcinoma of the lung may spread by any one of four routes: direct local extension, hematogenous dissemination, lymphatic spread, and, uncommonly, transbronchial spread. The preferential sites of extrapulmonary metastasis include the pre-scalene lymph nodes, liver, brain, adrenal glands, and bones.[4] SCCL derives no benefit from major surgical intervention, with a less than one per-cent five year survival.[5] However, the higher growth fraction and more rapid replication rate than other types of lung cancer makes this neoplasm more sensitive to both radiotherapy and chemotherapy.[6]

Classification of SCCL

Subjective morphological description of SCCL have resulted in controversy when attempting to classify this disease. Many oncologists now include the relatively non-responsive forms of lung cancer (squamous cell, adenocarcinoma and large cell anaplastic) as "non-oat cell" bronchiogenic carcinoma. Table I summarizes the current classifications of small cell lung cancer.

Table I. Histological Classifications of SCCL

W.H.O.[a]	V.A.L.G.[b]	W-P-L[d]	W.H.O.[a]
Fusiform	Oat cell[c]	Lymphocyte-like[c]	Oat cell[c]
Polygonal	Polygonal cell	Intermediate cell	Intermediate
Lymphocyte-like[c]		Other	Combined[e]

a. W.H.O., World Health Organization
b. V.A.L.G., Veterans Administration Lung Cancer Chemotherapy Study Group
c. Lymphocyte-like and oat cell used interchangeably in most series
d. W-P-L, Working Party for the Therapy of Lung Cancer
e. Includes small cell carcinoma with foci of adenocarcinoma or squamous cell carcinoma

Staging Evaluation

Potential variations in diagnostic approaches necessitate a staging system for small cell lung cancer. Fortunately, this staging system is relatively easy for patients having limited-stage disease, in which the tumor is limited to one hemithorax and the ipsilateral supraclavicular lymph node area, and is treatable within a single radiotherapeutic field. Patients with disease detectable elsewhere are designated as having extensive-stage disease. Current literature indicates that less than five per-cent of patients with extensive-stage disease survive for more than two years,[7] whereas patients with 'localized' disease survive much longer; therefore, this discussion will limit itself to the problems and treatment of limited-stage small cell lung cancer.

Table II illustrates the clinical work-up involved in staging SCCL.

Table II. Pretreatment Staging Evaluation

1. Physical examination
2. Chest roentgenogram
3. Fiberoptic bronchoscopy with biopsies
4. CT scan of brain
5. Radionuclide liver and bone scan
6. Bone marrow aspiration and biopsy

(from R.K. Oldham, 1980)

Clinical Features

Patients with SCCL rarely present asymptomatically, whereas this is common feature in patients with other forms of lung cancer.[8] Table III displays the initial signs and symptoms seen in SCCL.

Table III. Initial Signs and Symptoms of SCCL

Symptoms	Per cent	Signs	Per cent
Cough	60	Central lesion on X-ray	65
Weight loss	28	Peripheral lesion on X-ray	34
Dyspnea	26	SVC syndrome	7
Chest pain	22	Ectopic Hormone Syndrome	6
Hemoptysis	21	Secretion of inappropiate	
Fatigue	19	ADH	4
Abdominal pain	9	Cushing's	2
Back pain	8	CNS metastasis	13

(After J.C. Ruckdeshel, 1979)

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Pathology of Metastasis

The high metastatic potential for SCCL contributes to the poor prognosis in untreated patients. Recent work on the genesis of metastasis may provide some insight as to why this form of lung cancer has a higher propensity for distant spread than others.

Weiss[9] has summarized the evidence for a "metastatic cascade", stating that different metastatic patterns may be related to the biological differences in the tumor cells themselves. In order for a tumor cell to establish a metastatic focal point of lodgement, it must first dislodge itself from the primary tumor (fig. 1). A key role in this process may be the inherent "stickiness" of cells.[10] A normal, replicating cell will "round up" and lose some of its intercellular adhesiveness (i.e. decrease surface area, hence less intracellular contact). A rapidly growing tissue such as SCCL would have more cells in this less sticky state more often and hence, more cells might be released.

The Metastatic Cascade

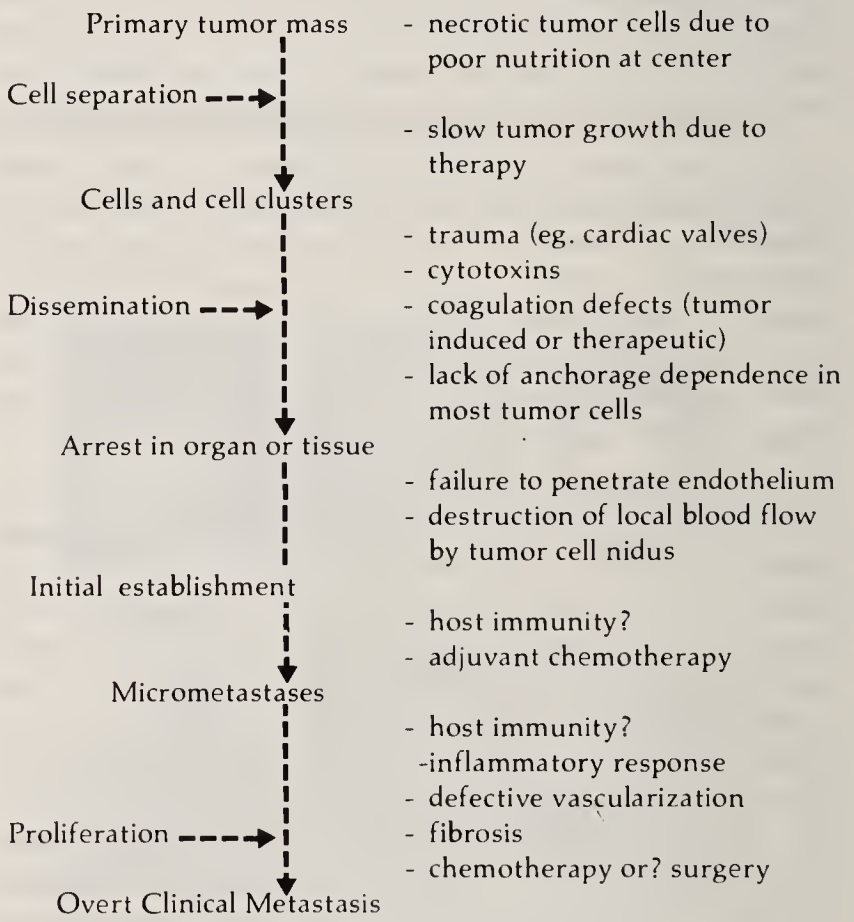

Figure 1. "Metastatic Cascade" as proposed by Weiss[9]

Treatment

All standard modalities including surgery, radiation therapy, chemotherapy and, more recently, specific and nonspecific immunotherapy are being used in treating lung come from aggressive surgery, patients with small cell lung cancer derive little help from surgery because most of them cancer derive little help from surgery because most of them have disseminated disease at the time of surgery. Hence, most surgeons will not resect for cure when SCCL is found at the

time of initial biopsy or thoracotomy. The survival of those tumors surgically resected depends on the stage of the disease, size of the lesion, histology, location of the lesion, and the presence or absence of atelectasis, pneumonitis, and pleural effusions with positive cytology.[17]

Current studies with immunotherapy (specific or non-specific) on patients with SCCL reveal no evidence to indicate any positive value of treatment (unlike other lung cancers).[11-14]

Radiotherapy and chemotherapy are effective in inducing remissions in SCCL. Some patients may have been cured entirely by this method.[15, 16] Recently, combined modality therapy employing radiotherapy and chemotherapy has been popular and appears to give the best results.[17]

The most frequently used chemotherapeutic agents for SCCL include cyclophosphamide, Adriamycin (doxorubicin), vincristine, lomustine (CCNU), methotrexate, procarbazine, and the epipodophylotoxin derivative VP-16-213. Among these listed agents, cyclophosphamide, Adriamycin, and methotrexate are probably the most useful. These agents have been combined into three and four drug combinations which have shown more activity with increased survival.[18] Currently, there are two frequently used combinations which includes cyclophosphamide, Adriamycin and vincristine,[19] and cyclophosphamide, CCNU and methotrexate.[20] Both these combinations have response rates exceeding fifty per cent.

When comparing the results of treatment an often overlooked fact is the grim outlook of untreated lung cancer. From well documented studies of the U.S.V.A.L.G.[21] (Table I) it was found that if patients were given no treatment the median survival for extensive SCCL was six to eight weeks. These survivals were calculated from the time at which the patients were randomized for either treatment or no treatment. This figure must be kept in mind when considering results with newer approaches of treatment. Patients with 'localized' disease confined to the hemithorax, including involvement of the ipsilateral scalene node, survive much longer than patients with extensive disease.

Treatment toxicities

Unfortunately, with treatment come the often toxic side effects which must be weighed against the slightly longer survival or higher remission rate. With single modality therapy the potential toxicities are as follows:

I. Toxicity of Radiotherapy

Early (1.5-3 weeks)

i. Esophagitis - rare
ii. Pneumonitis
iii. Cardiac toxicity

Late (2-6 months)

i. Pneumonitis and fibrosis
ii. Late cardiac effects
iii. Myelitis
iv. Skin reactions
v. Myelotoxicity
vi. Cerebral toxicity

(After R. Feld, 1981)

II. Toxicity of Chemotherapy

From the list of agents mentioned above, it is difficult to sort out individual drug toxicities because these agents are usually used in combination. Common side effects with the use of these agents include nausea and vomiting, alopecia, hemorrhagic cystitis, peripheral neuropathy and constipation, possible cardiotoxicity, mucositis, skin rash, possible hypotension, electrolyte disturbances, myelosuppression, neutropenia ($< 1{,}000$ neutrophils/μl), and other rare complications. The most important and potentially lethal side effects are the onset of infections (ie. pneumonia, skin infections, urinary tract infections) or bleeding secondary to the often significant myelosuppression seen with these agents. Thrombocytopenia ($< 100{,}000/\mu$l) may require platelet transfusion to prevent significant hemorrhaging.

III. Toxicities of Combined Modality Treatment - Radiation and Chemotherapy

Radiation esophagitis occurs frequently and can be severe resulting in stricture, but may be prevented if concomitant use of radiation and Adriamycin containing chemotherapy is avoided.

Radiation pneumonitis has an increased incidence when Adriamycin is used with irradiation. If these two modalities are given at least two weeks apart, there is a decreased chance of increased toxicity to the lung.

Cardiotoxicity is not increased when Adriamycin is combined with radiation unless recommended maximum doses of Adriamycin are exceeded.

Skin reations are enhanced using Adriamycin concomitantly with radiotherapy, but may be avoided if the two are not given concomitantly.

Infectious complications (non fatal) are slightly increased. When used concomitantly esophagitis and pneumonitis may result which may be superinfected, resulting in further infectious complications.

Thus, combined modality therapy is generally well tolerated with only a small increase in toxicity, unless Adriamycin-containing combinations are used concomitantly with radiation.

Conclusion

In summary, limited-stage small-cell carcinoma of the lung is a curable disease for approximately twenty-five per cent of the patients. A combined use of radiotherapy and intensive combination chemotherapy results in improving the median survival compared to intensive chemotherapy alone in SCCL. In addition to the seventy-five per cent of the limited-stage patients that ultimately die of cancer, there are more numerous extensive-stage patients who rarely survive two years disease-free. □

Acknowledgements

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BOOK REVIEW

Recollections of Death: A Medical Investigation
Michael B. Sabom, M.D., F.A.C.C.
(Harper & Row, 1982, $17.75)

This book deals with a Georgia cardiologist's clinical experience with 116 well-documented cases of Near Death Experience (NDE) among the various patients he encountered during his fellowship training at the University of Florida Shands and Veteran's Administration Hospitals. With the help of Sarah Kreutzinger, a psychiatric social worker and colleague, a considerable amount of subjective as well as objective data was gathered to verify and corroborate individual accounts of NDE. What distinguishes this particular study from the plethora of half-hearted attempts at "proving" the existence of an "afterlife" so often encountered in the popular press, is the highly objective and clinical nature of the investigation.

For those unfamilar with the subject of NDE, it is worth pointing out that accounts of individuals having 'died' only to return a few moments later to 'the real world' are as old as mankind itself. Typically, such individuals will speak of a sense of timelessness and tranquility, floating above their earthly bodies, travelling through darkness and into light, meeting deceased loved ones, and finally being forced to return to a physical existence, much to their regret.

In 1976 Raymond Moody Jr. published a book entitled *Life after Life*, which instantly caught the eye of the popular press, only to be met with scorn and disdain from the medical profession. And rightfully so, since many of Moody's patients had obvious biases, as did his conclusions, not to mention his interpretations.

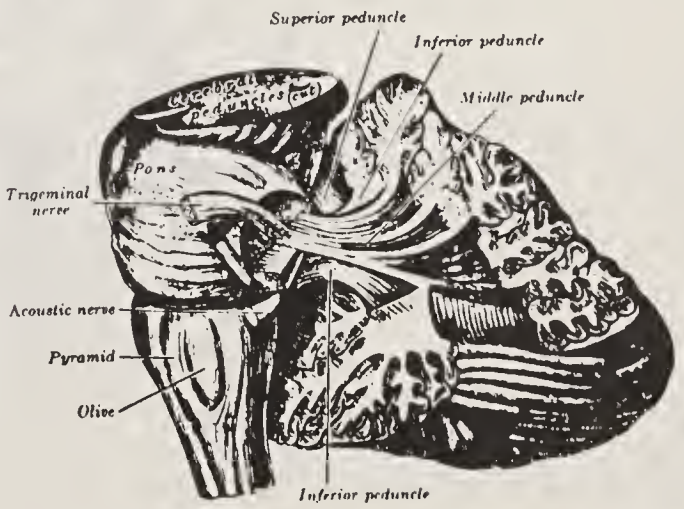
When Dr. Sabom undertook his prospective study of NDE's among the cardiology patients under his care, it was with a healthy dose of personal skepticism, backed up by an experimental design specifically intended to overcome Moody's own methodological shortcomings. And yet he quickly realized that he was dealing with a very real clinical situation that should be documented and investigated just like any other scientific phenomenon. His results indicate that 1) NDE's are common 2) they can be easily grouped into one of two distinct patterns, or as a combination of the two 3) the content of the NDE varies very little as a function of socio-economic status, religious faith, or prior knowledge of NDE's, and 4) that virtually all individuals who have experienced an NDE show a significant reduction in death anxiety as a result of the experience when compared to control groups using the Templer and Dickstein death-anxiety scales.

Analysis of the data is quite impressive, and it is here that Sabom took great pains to compare the patient's account of his own resuscitation, as viewed from the perspective of his NDE, with the objective documentation of his nursing records. In a highly significant number of cases, NDE patients were able to report with amazing accuracy the correct sequence of steps involved in their own "code 99", viewed, supposedly, from an out of body perspective. Complete descriptions of I.V. drug administration, intubation, manual CPR, and electric cardioversion right down to the movement of needles on dials, were freely offered. This was then compared with descriptions of "What a resuscitation would look like" from 25 age and disease-matched non-NDE patients, in order to rule out the effects of prior exposure through Basic CPR courses, television programs, etc. on possible confabulation on the part of the NDE patients. In the case of the non-NDE patients, 80% made one or more major flaws as they tried to imagine the sequence of events following a cardiac arrest in a hospital setting.

Other explanations of the NDE were analyzed. These included persistent semiconscious state, conscious fabrication, subconscious fabrication, depersonalization, autoscopic hallucinations, dreams, prior expectations about death, drug-induced hallucinations, endorphin release, and temporal lobe seizures. All were found to be lacking in some important detail found only in the NDE.

What then, is the medical significance of the NDE? For one thing, it appears to be a very real clinical entity that does not have to be viewed through any particular religious or pseudo-religious perspective in order to be appreciated. The reason for this is that it is an objective phenomenon that has been clinically documented. Secondly, by taking the NDE into account in dealing with the unconscious patient and the terminally ill, we can only add more value to their lives, while at the same time bring more compassion and humanity to the doctor-patient-family relationship; and Sabom makes several recommendations to this effect. His message, essentially, is that the medical profession can recognize the NDE for what it is and work along with it, albeit without a full understanding, to the patient's benefit. Such was the case with anaesthesia before membrane expansion and fluidization in the brainstem reticular formation was ever mentioned.

Michael Dan



(Reproduced from Gray's Anatomy, *29th American Edition, Lea & Febiger, Philadelphia, 1973)*

(Vachon — Cont'd from p. 6)

With regard to the politics of medicine. There is no simple solution. Learn that they are there. Watch how the skillful players operate and decide which approaches might work for you.

In closing, strategies for effective coping can be summed up in a quotation mentioned by one of the physican's interviewed "The chair of life has four legs: vocation, avocation, religion and relaxation" with fewer legs the chair is not steady and risks collapsing. □

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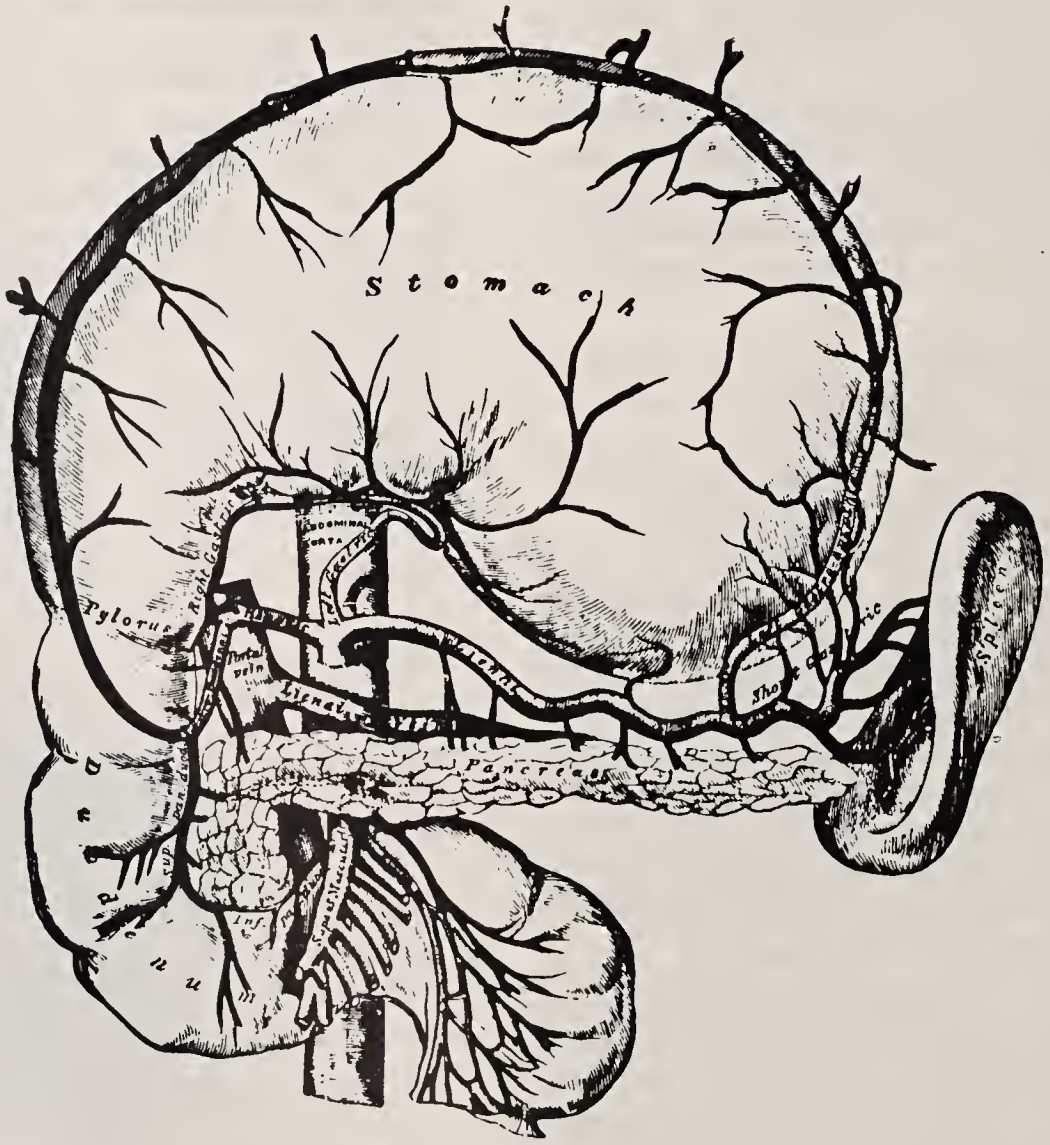

PLASTIC SURGERY

The Design and Evaluation of a Skin Wound Dextran Hydrogel Dressing

M.J. Bazos 8T5, P.Y. Wang*, and T.T. Drakos

And there went out fire from the Lord, and devoured them, and they died before the Lord...

(Leviticus, 10:2)

An epidermal dressing developed from insolubilized non-antigenic low molecular weight dextran cross-linked with chlorohydrin is described. The requirements for a skin wound covering are discussed and in particular, the criteria of fluid loss and bacterial infection are considered. A pre-clinical pilot study of the hydrogel dressing revealed a reduction in evaporative loss, exudate absorption, and significant wound contraction. In addition, the dressing was found to cling and conform to body contours. The cost of this new dressing is only a fraction of the conventionally preserved xenograft.

Ever since man discovered fire, burns and trauma have become two of the most common and severe injuries, Skin trauma has long been considered a 'neglected disease' due to the superficial nature of the injury to the body's protective dermal and epidermal layers. Last year, in Ontario alone, over 50,000 reported victims suffered loss of skin due to trauma. This neglected disease readily progresses to subsequent complications including autograft and perivascular damage (e.g. ulceration). In addition, burn wounds (by electrical, chemical or thermal agents) coupled with the above constitute one of the principal causes of death in North America. Unfortunately, over one-third of these victims are children. In certain third world countries more children die from burns than from acute infectious diseases. Clearly, then, treatment of this neglected disease must be improved.

This report describes the use of a dextran hydrogel as a temporary skin substitute.

Experiment

1. Preparation of the Polysaccharide Hydrogel

Membrane and paste forms of the hydrogel differ mainly in their water content.

Membrane preparation begins by solubilizing the suitable dextran grade in water. Following the addition of sodium hydroxide and epichlorohydrin the mixture is stirred vigourously to obtain a fine dispersion, after which it is poured into a polyethylene mold. The crosslinked membrane will gel in four to six hours, whereupon the excess alkali is leached out into aqueous medium. Humectation of the gel sheet is performed by soaking it in a series of suitable moistening phases: (1) glycerol then (2) isopropanol/ propylene glycol. Bacteriocidal agents may be added at this stage.

The paste form of hydrogel is prepared by combining the above ingredients and allowing an extended gel setting time of 8 to 14 hours. At this time a block of elastic insolubilized dextran has formed and can be emulsified with excess deionized water. After repeated water transfers the mixture is filtered and later homogenized to a uniform consistency. Humectation again proceeds as above and selective antibiotics (e.g. betadine, sulfadiazine) may be added to the moistening phase media.

2. In Vivo testing

Male Wistar rats weighing 320 – 480 g were given a standard diet and water *ad libitum*. Operative procedures were performed under sodium pentobarbital anesthesia (1.0 ml/kg i.p.) in accordance with the Animals for Research Act of Ontario.

The dorsal area of the animal was shaved with an Oster 30 head and cleansed with betadine. A rectangular section 2 cm x 3 cm was surgically clipped to approximately 1 mm in depth to simulate a partial thickness skin wound. The wound area was outlined using a scalpel and then a small Metzenbaum scissors.

3. Wound Covering

The coverings were applied to extend 1 to 1.5 cm beyond the circumference of the wound. After evaporative loss was determined, the covering was removed and its thickness was measured using microcalipers.

The paste was applied to the wound by spreading it with a flat spatula 1 to 2 cm outside the wound edge. The membranes were applied by first running the paste around the edge of the wound out to 1 cm away from the edge. The membrane was then pressed evenly and firmly over the wound and paste.

4. Measurement of Evaporative Losses

Evaporative loss from the 2 cm dextran covered wounds was determined by using the hygrometer system[8]. Basically, the system consisted of a compressed air source, polystyrene, and a drying tube filled with Drierite dessicant ($CaSO_4$). The loss was calculated using the following formula:

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$$\text{evaporative loss} = \frac{W_2 - W_1}{\Delta t \cdot A}$$

where W_2 = final weight of drying tube (in mg)
W_1 = initial weight of drying tube
Δt = time in seconds
A = surface area of wound in cm^2
(*ibid*).

Results

Wound Covering: Preliminary experiments revealed that the simulated skin wounds covered by the polysaccharide membrane exhibited no eschar formation, tissue distortion, fluid accumulation, adhesion, or presence of necrotic tissue, and the wound could be successfully grafted after 14 days. Due to the gel's flexibility and slight tackiness, the membrane conformed to the contours of the body and wound without adhering too strongly, yet still prevented the tissue from drying, and sealed bacteria out[6,7].

Evaporative Loss: A rapid decrease in evaporative loss from the covered wound occurred during the initial 3 days which then tapered off on the subsequent 3 days. After this time evaporative loss was negligible.

Discussion

Dextran is a branched homopolysaccharide composed of α-D-glucopyranosyl units with α-(1,6) linkages and a small number of α-(1,3) linked side chains. This natural polymer exists in various sizes which are sold in different grades indicative of the molecular weight. At a M.W. of less than 100,000, insolubilized dextran is a gel with different water regain values when hydrated.

The severity of skin loss following trauma such as burns and degloving injuries has prompted the use of a host of biological and synthetic dressings with various degrees of success. Advantages of the hydrogel skin substitute include its low cost, non-immunogenicity, and adherence to moist tissue surfaces. The structure of the gel permits gas exchange and fluid regulation.

The skin substiute may replace temporary grafts as it allows the inexpensive, less painful growth of a wound bed more suitable to receive a permanent graft. In some cases, however, it may be more appropriate to use the gels until healing is complete.

1. Pathology and Pathophysiology — Signs and Symptoms

Burns are classified into three groups based on the degree of tissue damage.[1] First-degree burns involve reddening of the skin and are due to damage to the outer layer of the epidermis[4] (Fig. 1). Second-degree burns include blistering of the skin as well as superficial burning. Thin skin blisters are caused by accumulations of plasma between dermis and epidermis, whereas in thick skin, the site is intraepidermal. Third-degree (full-thickness) burns cause destruction of both the dermis and the epidermis. The surface may appear charred, or white (due to coagulated vessels) and is often insensitive to pinprick. Nerve endings are destroyed in deep burns which are less painful than superficial burns.

Classic symptoms involve: (1) incipient shock — thirst, restless, increased pulse rate, or a fall in blood pressure when moved from recumbent to sitting position; progressing to (2) advanced shock — low blood pressure, weak thready pulse, cold clammy extremities, pale face with beads of cold perspiration, increased respiration, confusion and oliguria.[2] Shock increases rapidly with the loss of plasma 'oozing' from the burnt area, and with the escape of blood or plasma into the tissues.

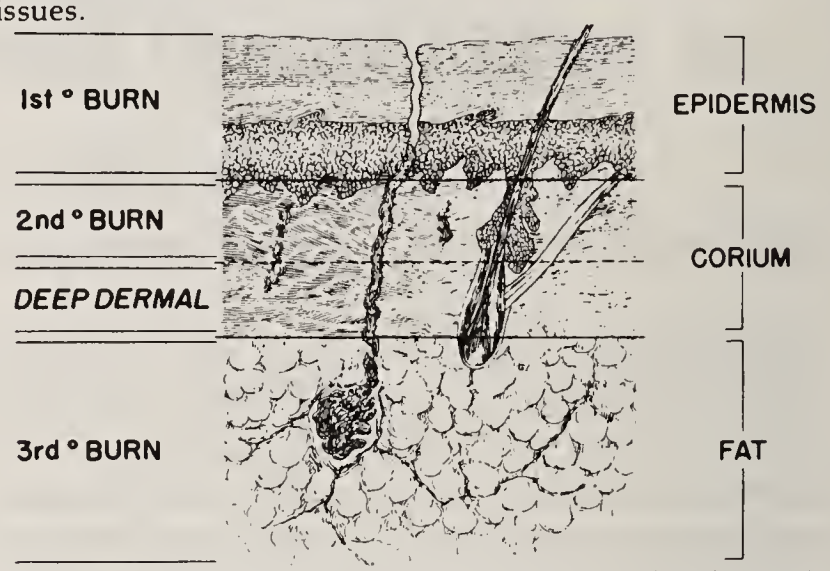

Figure 1. Drawing of a section of thick skin. (After Rudowski, 1971).

A burn victim (Fig. 2) may suffer abberant damage which can impede the overall treatment considerably. For instance besides the obvious social difficulties, the patient's lack of cosmetic appeal could lead to psychological problems of apathy, emotional withdrawal to suicidal feelings. Concommitant psychiatric symptoms may include egodystonosis, manic depression and traumatogenic psychosis.

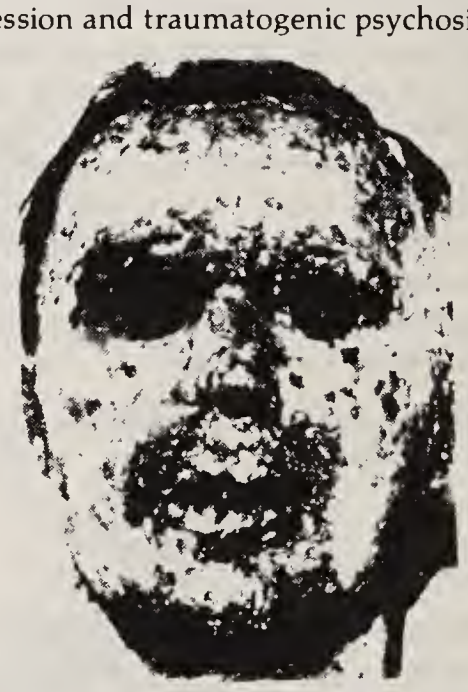

Figure 2. Extensive Facial Burns[5]

2. Treatment — Grafting versus Dressing

Treatment of all burns involves pain relief, shock preventions, control of infection, correction of fluid loss, and maintenance of nutrition. Treatment of shock takes precedence over local therapy[2]. When the burn patient has successfully passed through the resuscitation period, the burn wound itself presents the greatest threat to survival. Thus, the problem of dressing the massive tissue defects becomes the most important consideration in the development of new skin injury treatments.

In attempts to reduce infection and decrease fluid loss, biological grafts from various donors and synthetic dressings and synthetic have been used. Although *autografts* (same individual) are preferred, this method is limited due to (1) the

limited number of adequate donor sites, and (2) the control of local infection. Cadaveric *homografts* (same species) are popular in North America but they're in short supply and in the absence of immunosuppressive therapy these homografts are often rejected. After seven to ten days post-transplant homograft rejection induces inflammation, necrosis and dissolution. However, an extended period of coverage would facilitate autography, providing donor sites became available. *Heterografts* (different species, e.g. pigskin) must be changed every 2 to 4 days and much more frequently on an infected wound. The high cost of homografts and heterografts has provoked a search for alternative biological grafts. One such graft involves amniotic membranes. This reduces evaporative loss and acts as an infection barrier. However it must be changed at least every 2 days until a suitable surface for autography is achieved. Recently, non-adherent perforated thermoplastic films with absorbent inner pads have been utilized; but they do not seal around the edges of the wound and hence permit bacterial contamination. In addition, they do not decrease the body's oxygen consumption or lower its metabolic rate.

Synthetic dressings include: polyvinyl alcohol, polyvinyl chloride along with nylon velour, and polyurethanes. Polyurethane films stick to the intact skin around the injury sealing out bacteria, but do not allow adequate transmission of exudative fluid by evaporation. This poses an obvious problem in cases of severe infection with excessive drainage. All were found to be inferior to true biological dressings because of a high incidence of infection and a relatively low capacity for inducing vascularization and epithelial lamination. Reconstructed collagen membranes have been used in many forms as biological dessings in local burn treatment. □

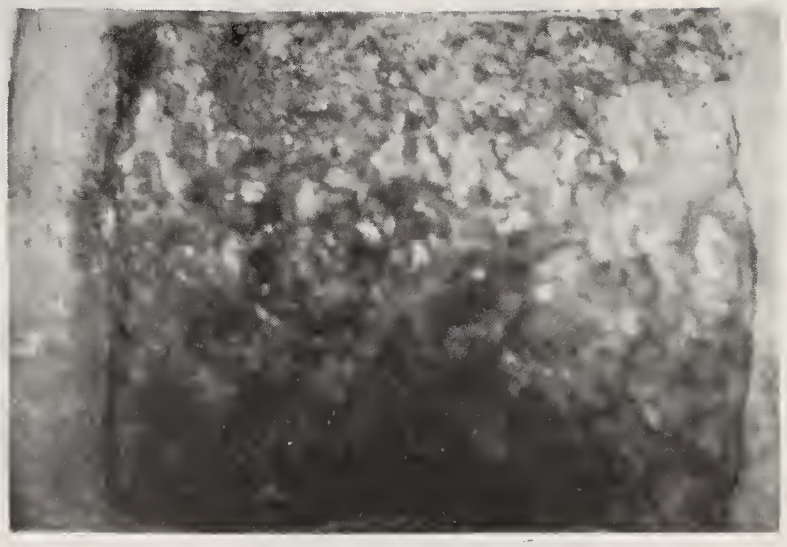

Figure 3. Wound covered with paste applied by hand.

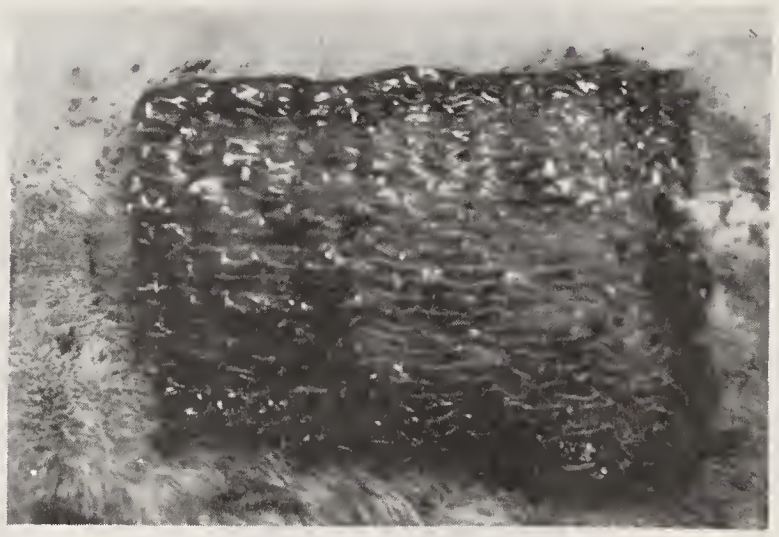

Figure 4. Wound covered using sheet with gauze.

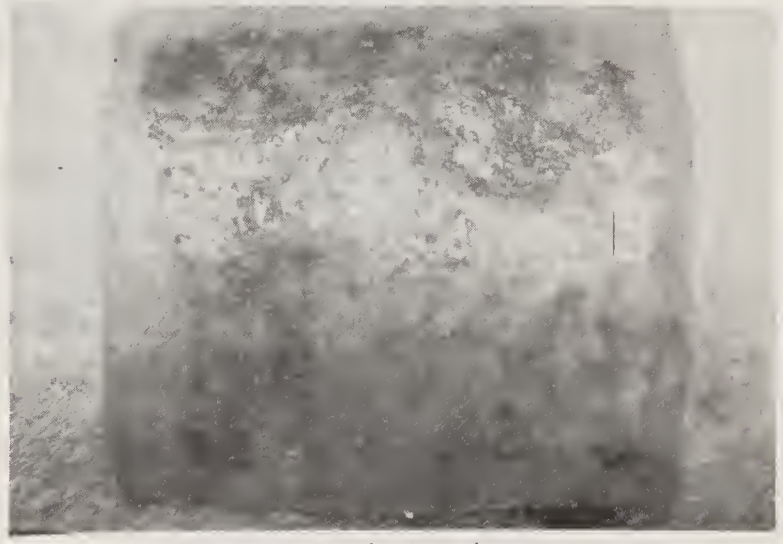

Figure 5. Wound covered with plain sheet.

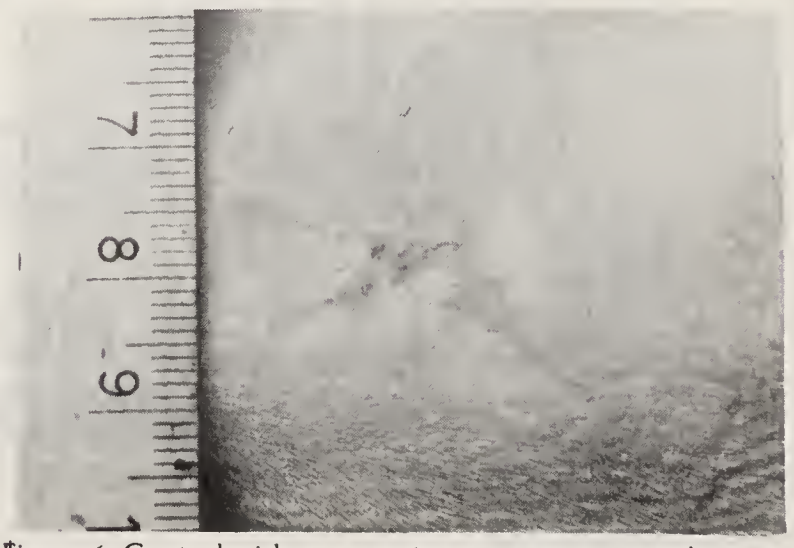

Figure 6. Control without covering gave 100% wound contraction.

Acknowledgements

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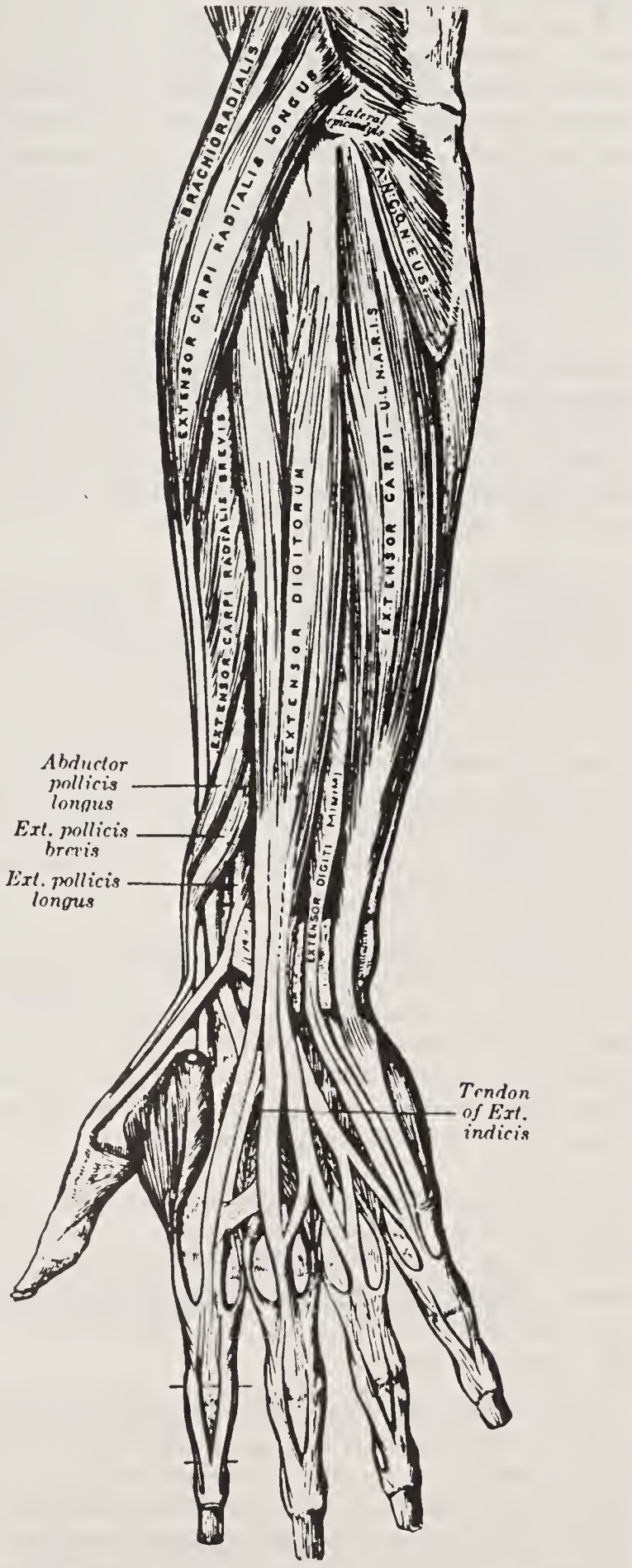

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THE FINAL WORD

Taking Control

by Harley Hahn 8T4

There is a saying, "The proof of the pudding is in the tasting." I say: "The proof of the philosophy is in the living." So many people are dissatisfied with the way their lives are unfolding. They see themselves as automatons, as pinballs ricochetting aimlessly. And somehow, the plethora of pop psychologies, from cults to seminars, from ancient books of wisdom to contemporary best-sellers, fails to ameliorate. If the proof of the philosophy is truly in the living, then it is clear that shallow psychological and mystical double-talk is not the key to enlightenment and peace of mind.

Life is most confusing when we feel that things are out of control. Although we all expect there to be circumstances around us that we must accept, it is most aggravating when we are handicapped by a loss of internal control. For example, we may think to ourselves, "I want to do this, but I am tempted to do something else... I know what I should do but I can't make myself do it."

A thoughtful analysis is called for. What forces are at operation here and how can we gain control of them? We notice that some people seem to have "gotten it together", but what exactly have they got? And how can we get it?

Let us start with what was implied by the statement I made above: the inability to initiate purposeful effort. If you examine the quandry that I expressed you will notice that there is more than one "I". There is an "I" who wants to do something, an "I" that wants something else, and yet another "I" that feels the pangs of conscience.

All of us have a choir of voices on the inside — parts of us that beg to be noticed, and sporadically offer their opinions. It is as if the decisions we make are by consensus. We can divide the parts of our minds into those that are the seat of our basic instincts and desires and those that act as our conscience. These two divisions were described by Freud who named them the Id and the Superego respectively.

Freud also described a third part of the mind which he called the Ego. The Ego exists as an agent to act for us in the outside world. It is the Ego that we identify as being "Me". The Ego is constantly balancing the demands of the Id against our external environment and the moral code of the Superego (literally, "above the Ego").

We are now in a position to understand our quandry. Often, the Ego decides to do something (like write a poem) and it immediately must come to terms with the Superego (which tells us that we really ought to be washing the dishes), and the Id (which would rather eat an ice cream cone). The distinguishing feature of a person who has "gotten it together" is that he has developed a strong Ego*, one that can negotiate wisely with the demands of both the Id and the Superego, and when necessary, take control.

That is the skill that you must develop if you are to "get it together". During those board meetings of your mind, when all the voices are arguing and demanding their way, you (your Ego) must be firm and look out for your interests as a whole.

An important measure of your maturity is how well your Ego has developed. You started life as a completely self-centered baby, concerned only with meeting your basic needs and feeling good. As you grew, you encountered opposition to your various needs from different sources, including other people. You had to learn the principle of long-term gratification — that you must be able to plan for more than just the present moment. The overriding trend of maturity is from dependence to independence. This corresponds to developing and then strengthening your Ego.

Unfortunately, there are many people who have run into trouble somewhere along the way. If you think and observe carefully, you will notice how desperate and nervous most people are.

If you are to enjoy yourself in this life, then somewhere along the line you are going to have to invest your Ego with psychic strength — that is, you are going to have to take control. I will show you two ways to do so.

The first is by the use of habit. A habit is a behaviour plan or tendency that we develop from repeated exposure to certain types of situations. One benefit is obvious: there are many times when by following the dictates of habit we are spared having to devote conscious energy to a task (for example, choosing what to eat at a restaurant).

Habit also has another important quality: it allows your Ego to take control in a situation where it would otherwise have a difficult time. For example, if you have formed the habit of eating a small piece of cake when it is offered, you will be able to enjoy desert more than if you suffer from pangs of conscience (from your Superego which might want you to forgo the cake completely), or from unrealistic desire (from your Id which wants to indulge).

Habit can be a lever which allows your Ego to exercise control beyond its usual strength. However, as we all know, habits can sometimes act against our long-range self-interests (for example, smoking cigarettes).

Habits seem to have a strength of their own. To make or

* Do not confuse having a strong ego with being "egotistical" or vain.

break a habit requires significant psychic effort. These two traits, viz. that habits can be both helpful and harmful, and that they can, through effort, be formed or broken, leads us to our next important point: you must learn the skills of controlling your habits. And by controlling habits I mean not only breaking them, but forming them.

These skills are among the most important in life, and yet receive so little attention. Coming to terms with habit is a slow process. To do so, you need to realize that most habits are not unchangeable. Rather, they are patterns of behaviour that you have learned. You can both learn new habits and break old ones if you want.

But habits possess great psychic strength and they are neither easily created nor easily destroyed. They are powerful and you must be prepared to devote time and effort to their cultivation. The way to form a habit is to practise repeatedly. There is no easy way. This does not mean that the process must be unpleasant, although sometimes unavoidably it will be so.

People often follow patterns of behaviour that were set when they were young. It is important to identify habits that are not appropriate. You must set aside moments of contemplation and analyze your behavior, identifying those facets that are against your self-interest and those patterns that would work towards it. Then you must practise the behaviour that you wish to become second nature. You must commit yourself to it.

I mentioned above that there are two ways to strengthen your Ego and take control. Controlling your habits is necessary but habits are not adequate to run your life. You are all the time encountering situations that are new, during which past experience can act only as a guideline. It is then that inner strength is most important because you don't have the ancillary force of habit to supplement your Ego.

For example, it is a warm Saturday afternoon and you decide that you would enjoy a jog around the neighborhood. But you are feeling guilty for not visiting your grandparents and, as well, you are tempted to indulge in potato chips and beer and fall asleep in front of the the TV. What you must do in a situation like this one is to stand back and see beyond both short-sighted desires and the dutiful dictates of conscience. Look on this as an opportunity for practising to take control.

As with habit, taking control is easy once you have practised it. And it is important that you start to do so in easy situations. Inner psychic strength is like physical strength -- you develop it by using it. There is no shortcut, no easy way out. Every time you exert influence towards your long-range well-being you add to the strength of your Ego. Just as with physical strength, psychic strength can be consciously built up.

Many people find, to their dismay, that when fate thrusts them into a situation requiring definite, purposeful effort, they are incapable of it. Committing yourself to the long-range goal of developing your inner strength will help you feel confident about handling the unpredictable vicissitudes of human affairs. You will have strength in yourself and it will be unnecessary to spend a large amount of your energy chasing all over the place, looking for "security". You will feel confident that, come what may, you will be able to look out for and care for yourself.

But a strong Ego and the inner strength it grants you come only with maturity and positive experience. As with habit, the key is committment and practise.

Having discussed the importance of controlling your life, I would now like to make a suggetion about the manner in which you should consider yourself. I talked earlier of your mind as consisting of three families of psychic forces, and of these forces as if they were distinct entities. Actually, this is only a model. Realize that for your mind to function smoothly these forces must blend together and be constantly interacting and compromising with each other.

Although it is important to develop a strong Ego, it is also important to give the other aspects of yourself their due. Your Superego is not only your conscience but the seat of your ideals. It is the embodiment of the lessons learned from your parents, your teachers, and other keepers of authority. Although sometimes it may be overly strict and irrational, it is necessary to adhere, at least partially, to its recommendations if you are to get along in the world. And your Id, although it is the origin of basal, selfish desires, it also begs your indulgence. For it is only through the wise gratification of these irrational infantile urges that true happiness lies.

What is called for is harmony. You must take control when necessary but you must keep the peace with your conscience and your desires. Another way of putting this is that you must be kind to yourself. You must develop a strong love for yourself. Be considerate. You wouldn't be overly strict or indulgent with a loved one, and yet many people constantly treat themselves like a naughty or spoiled child.

Happiness and satisfying fulfillment come only from developing judgment, wisdom, and confidence. As tempting as it may be to believe so, you will not be able to cultivate these qualities by reading a book, attending a seminar, or having a divine revelation. Rather, they develop from a lifetime characterized by purposeful effort, thoughtful contemplation, and compassion. □

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ORTHO-NOVUM* 1/50

NORETHINDRONE
AND MESTRANOL
TABLETS

Indication: Conception control.

Contraindications: Thrombophlebitis, thromboembolic disorders, cerebral vascular disease, coronary thrombosis, or a history of these conditions; significant liver dysfunction or disease; history of cholestatic jaundice; known or suspected malignancy of the breast or genital tract, or history of these conditions; known or suspected estrogen-dependent neoplasia; undiagnosed abnormal vaginal bleeding; known or suspected pregnancy; during the period a mother is breast-feeding an infant; any ocular lesion associated with ophthalmic vascular disease such as partial or complete loss of vision, defect in visual fields or diplopia, classical migraine.

Warnings: Oiscontinue medication at the earliest manifestations of: A. Thromboembolic disorders. B. Visual disturbances including; (i) gradual or sudden, partial or complete loss of vision; (ii) proptosis or diplopia; (iii) onset or aggravation of migraine; (iv) papilledema; (v) opthalmic vascular lesions. C. Oevelopment of headache which is recurrent; persistent or severe and undiagnosed. O. Psychiatric disturbances. Rule out pregnancy in patients who have missed a menstrual period. Patients with epilepsy, diabetes mellitus, asthma and cardiac or renal dysfunction require careful observation. In women with predisposing factors for cardiovascular disease, oral contraceptives have been reported as an additional risk. After the age of 40 years, for purposes of fertility control, oral contraceptives should be considered only in exceptional circumstances, and when the risk/benefit ratio has been carefully weighed by both the physician and the patient.

Precautions: Before use, take a thorough history, and perform a thorough physical examination including a blood pressure determination and examination of breasts, liver and pelvic organs. A Pap Smear should be taken. First follow-up examination is at 6 months, and at least yearly thereafter, including all tests initially performed. Women with a history of jaundice should be prescribed oral contraceptives under close observation. If there is a history of cholestatic jaundice, especially during pregnancy, other methods of contraception should be prescribed. The development of severe generalized pruritus or icterus requires that the medication be withdrawn until the problem is resolved. If jaundice is cholestatic in type, do not resume oral contraceptive administration. Changes in composition of bile and the appearance of cholesterol gallstones have been reported in women taking oral contraceptives. Hepatic neoplasms and nodular hyperplasias or hamartomas have been reported in oral contraceptive users. Although these tumors are uncommon, they have caused fatal intra-abdominal hemorrhage and should be considered in women presenting with acute abdominal pain, an abdominal mass or evidence of intra-abdominal bleeding. Patients with essential hypertension may be prescribed oral contraceptives under close supervision. If a significant blood pressure elevation in previously normotensive or hypertensive subjects occurs at any time, cessation of medication is indicated. Oiabetic patients or those with a family history of diabetes should be observed closely. Latent diabetics who can be kept under close supervision may be prescribed oral contraceptives. Young patients with overt diabetes whose disease is of recent origin, well-controlled and not associated with hypertension or other signs of vascular disease should be closely observed. In metabolic or endocrine diseases and when calcium and phosphorus metabolism is abnormal, careful clinical evaluation should precede medication. The risk of complications due to adrenocortical insufficiency appears to be minimal with oral contraceptive therapy. Estrogen-progestogen combinations may cause an increase in plasma lipoproteins and should be administered with caution to women known to have preexistent hyperlipoproteinemia. Use special judgement in prescribing oral contraceptives to women with fibrocystic breast disease. Persistent irregular vaginal bleeding requires investigation to exclude the possibility of pregnancy or neoplasm. Observe patients with fibroids carefully. Sudden enlargement, pain or tenderness of uterine fibroids require discontinuation of medication. Assess adolescent patients for adequate skeletal development prior to medication, since oral contraceptives may accelerate epiphyseal closure. Oral contraceptive therapy may mask the onset of the climacteric. In general, women in the later reproductive years gradually assume an increasing risk of circulatory and metabolic complications, especially at age 35 to 40. Shorter duration of oral contraceptive use, and avoidance of cigarette smoking is advisable. Patients with a history of emotional disturbances, especially the depressive type, are more prone to have a recurrence. In cases of serious recurrence, the medication should be discontinued in favour of a non-hormonal method of contraception for a trial period to determine if the symptom is therapy related. The following laboratory tests should not be considered reliable unless oral contraceptive therapy has been discontinued for 2 to 4 months: liver function tests; coagulation tests; thyroid function tests; adrenocortical function tests; reproductive endocrine profile changes; and other tests involving phospholipids, triglycerides, serum folate, tryptophan metabolism, and serum glucose. Advise pathologists of oral contraceptive therapy when specimens are submitted for examination. After discontinuing oral contraceptives, the patient should use an alternate non-hormonal method of conception control and await the resumption of normal ovulatory cycles before attempting to become pregnant. Women with a history of oligomenorrhea or secondary amenorrhea or women with irregular cycles may remain anovulatory or become amenorrheic following estrogen-progestogen combination therapy. Amenorrhea, especially if associated with breast secretion that continues for 6 months or more after withdrawal, warrants a careful assessment of hypothalamic-pituitary function. Fetal abnormalities have occured in the offspring of women who have taken progestogens and/or estrogens during pregnancy. The safety of oral contraceptives in pregnancy has not been demonstrated. Rule out pregnancy before initiating or continuing the contraceptive regimen. Always consider pregnancy if withdrawal bleeding does not occur. Retrospective studies have reported an increased risk of post-surgery thromboembolic complication in oral contraceptive users. Therapy should be discontinued at least 1 month prior to elective surgery and not resumed until at least 2 weeks after hospital discharge following surgery associated with an increased risk of thromboembolism. A reduced efficacy and increased incidence of breakthrough bleeding have been reported in oral contraceptive users treated concomitantly with barbiturates, rifampicin, phenylbutazone, phenytoin or ampicillin. Protracted vomiting and/or diarrhea may decrease the absorption and effectiveness of oral contraceptives. Should these occur, an additional method of contraception should be recommended for the remainder of the cycle.

An increased risk of the following seriously adverse reactions has been associated with the use of oral contraceptives; thrombophlebitis; pulmonary embolism; mesenteric thrombosis; neuro-ocular lesions; myocardial infarction; cerebral thrombosis; cerebral hemorrhage; hypertension; benign hepatic tumors; gall bladder disease, congenital anomalies. The following adverse reactions have also been reported in patients receiving oral contraceptives: nausea and vomiting; gastrointestinal symptoms; breakthrough bleeding and spotting; change in menstrual flow; dysmenorrhea; amenorrhea; temporary infertility; edema; chloasma; melasma; breast changes; weight change; endocervical hyperplasias; diminution in lactation when given immediately postpartum; cholestatic jaundice; migraine; increased size of uterine leiomyomata; rash; mental depression; reduced carbohydrate tolerance; vaginal candidiasis; premenstrual-like syndrome; intolerance to contact lens; change in corneal curvature; cataracts; libido change; chorea; appetite change; cystitis-like syndrome; headache; nervousness; dizziness; hirsutism; loss of scalp hair; erythema multiforme; erythema nodosum; hemorrhagic eruption; vaginitis; porphyria; impaired renal function.

Dosage: - 21 day regimen: 1 tablet daily for 21 days, followed by 7 days without medication.
Cyclic administration.

- 28 day regimen: 1 tablet daily for 21 days, followed by 7 inert green tablets.
Continuous administration.

Supplied: ORTHO 1/35: each peach tablet engraved on both sides with "ORTHO 1" contains 1.0 mg norethindrone and 35 mcg ethinyl estradiol. ORTHO-NOVUM 1/50: each yellow tablet engraved on both sides with "ORTHO 1" contains 1.0 mg norethindrone and 50 mcg mestranol. In the 28-day regimens the green tablets contain inert ingredients. Available in a 21-day or 28-day DIALPAK* Tablet Oispenser.

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